THE ENGINEERING AND MINING JOURNAL

COAL

Entered at the Post-Office of New York, N. Y., as Second-Class Matter.

VOL. XLVIII. SEPTEMBER 28. No. 13.

RICHARD P. ROTHWELL, C.E, M.E.
ROSSITER W. RAYMOND, Ph.D., M.E. } Editors.

Cable Address: "Rothwell," New York.

Books for review and all communications for the JOURNAL should be addressed, Managing Editor, P. O. Box 1833, New York.

Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P. O. Box 1465, New York. Articles written by Mr. Raymond will be signed thus *; and only for articles so signed is he responsible.

London Office: Finsbury Chambers, 76 Finsbury Pavement, London, E. C. Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.

Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.

Peru, South America: Mr. John Newton, No. 2 Calle Constitucion, Calla.

Australasia: Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage:

Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, $4 per annum; $2.25 for six months; all other countries in the Postal Union, $5.

Monthly Export Edition, all countries, $2.50 gold value per annum.

REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

FILE COVERS will be sent by mail for $1.00, or delivered at office for 75 cents each.

THE SCIENTIFIC PUBLISHING CO., Publishers,

SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres & Gen'l Manager
P.O. Box 1833. 27 Park Place, New York.

The Table of Contents will be found at the end of the reading matter, page 281.

A SIXTEEN-PAGE supplement, containing an installment of Howe's "Metallurgy of Steel," accompanies this number of the ENGINEERING AND MINING JOURNAL.

WE are advised from France that a new use has been found for tellurium, and there is some demand for ores of that metal. We shall be pleased to hear from those who can furnish tellurium ores in quantity.

ON the authority of our contemporary, *Mining Industry*, of Denver, we learn that at no period in its history has the output of Leadville equaled that at present. The daily shipments of ore from the mines are running steadily from 1,300 to 1,400 tons, having a gross value of over $50,000, or an annual production of $18,000,000. This is said to have been the condition of affairs for several months past, and if a correct representation, as we have no doubt it is, we fail to see where the ruin to the American silver and lead mining industry comes in, especially that centered near Leadville, which, in the recent meetings in Colorado to protest against the free admission of silver-lead ore, was portrayed in vivid colors as already taking place. This condition of prosperity was evidently in full swing before the recent Treasury instructions reduced the amount of imported ore.

PRESIDENT DIAZ' MESSAGE TO THE MEXICAN CONGRESS.

The opening address read by President DIAZ to the deputies and senators of Congress in the City of Mexico on the 16th inst. marks another step in the now peaceful history of that formerly strife-torn republic. In fulfilling his constitutional duty, which is to render an account of public business since his last report, the President says he is able to summarize the situation by stating that order and tranquility continue to reign throughout the length and breadth of the land, and that there has been no change in the harmonious relations existing with foreign powers. The details which follow this brief but satisfactory summary are of interest as showing the material progress made by the country under the influence of peace, improved communication, liberal investments of foreign and domestic capital, and good government. There is a dignified reserve in avoiding all reference to the much vexed questions of ore exportations and the strict interpretation and enforcement of the law respecting differential shipping dues, recently put into effect by the United States against Mexico. But what will be of most interest to our readers, perhaps, is the extended space devoted to internal improvements, such as the temporary pumping station for the drainage of the City of Mexico, which we have already described and illustrated in our issue of August 10th, the great drainage tunnel and canal, and the numerous railroads under construction.

The activity of the mining industry is also dwelt upon, and is shown by the number of "denouncements" of mines and reduction works, as well as by the fact that thirty-seven new contracts have been signed with the Department of Public Works for the development of special mineral zones. The importance of these special contracts will be appreciated when the statement of the President is considered, that the due performance of all such contracts, 167 in number, involves the investment of more than $46,000,000 in the mining and metallurgical industries of the country, and that there is now deposited in the Treasury, subject to forfeiture in case of non-fulfillment of contracts, the sum of $398,000.

Naturally, when the internal life of the country is proving itself so active and healthy, the finances of the government are more flourishing than ever before, and its credit is established on a basis that would have appeared a Utopian dream only a few years ago.

The extension of the telegraph lines and the development of the postal business of the country, both internal and foreign, combine with the other records of progress to make the document most satisfactory and reassuring reading for any one having investments there. Those of our manufacturers and merchants wishing to cultivate trade relations with our neighbor can do so now with much greater confidence than when Mexico first attracted commercial attention in this country some few years since.

GEORGE H. COOK.

The sudden death, on the 22d instant, at New Brunswick, of Dr. GEORGE H. COOK, State Geologist of New Jersey and Vice-President of Rutgers College, has removed one of the most judicious, efficient and trustworthy of the leaders and laborers in American science, one whose work was as universally admired and valued as his person and character were universally esteemed and loved.

It is not our purpose to recount fully, at this time, the events of the seventy-two years of Dr. COOK'S career. A biographical notice by Prof. JOHN C. SMOCK, his intimate friend, and for many years his trusted assistant, will be read next week at the Ottawa meeting of the American Institute of Mining Engineers, of which body he was an honored member. We shall publish next week a portrait of Professor COOK, with a sketch of his life.

The secret and the measure of success is influence. Tried by this test, the career of Dr. COOK was completely successful. As an instructor in his *alma mater*, the Troy Polytechnic, in the Albany Academy and in Rutgers College; as an administrator and organizer in connection with those institutions, and with the New Jersey State Boards of Agriculture and Health and the State Weather Service; and as the active head of the New Jersey Geological Survey, he exhibited business sagacity and social tact, no less than scientific precision and enthusiasm. His management of the Survey was specially wise and efficient, commanding in an exceptional degree both the respect of experts and the confidence and support of the people at large. Its results in the unsurpassed excellence and thoroughness of the topographical and geological atlas of New Jersey, and the popular and scientific value of the current annual reports of the Survey, have won general recognition. The final report, upon which Dr. COOK was engaged when he died, will, we trust, be found so nearly complete that it may be worthily finished by other hands according to his plan, thus crowning symmetrically the most important labor of his life.

Such success is not attained irrespective of moral qualities. The uprightness, candor, simplicity, amiability and generosity of Dr. COOK'S character were impressed on all his words and works, and constituted a seal, imparting guaranteed validity to his scientific conclusions. Unselfish, loyal, sincere, open-minded, he must be ranked with FARADAY, AGASSIZ, and HENRY as an example of the noblest type of the disciple of science.

One characteristic feature of his geological reports deserves to be specially called to notice. We refer to their extreme moderation and caution. We are accustomed to see geologists signalize their labors in new fields by the early promulgation of new theories. Either they declare the age of some rock to be other than was previously supposed, or they announce a new historical or genetical scheme. Not infrequently, the observer just over the boundary, in the next field, has come, by similarly hasty induction from similarly limited data, to a different conclusion; and the contradictory views which were fondly expected to make two men famous contribute by the reciprocal exposure of error to the mortification of both.

The geology of New Jersey presents a number of interesting and difficult questions in connection with the classification of the crystalline rocks; the mutual relation of the different groups; the formation and transformation, location and dislocation, of the magnetite deposits; the phenomena and effects of the Glacial period, etc. But Dr. COOK exhibited an extraordinary self-control in avoiding premature deductions from the facts observed in his field. Many of us have been at times almost impatient with his caution in this respect. But now we realize the great advantage of feeling, as we study his recorded observations, that they need no allowance for a preconceived theory on his part; while the few simple generalizations in which he indulged are well-nigh demonstrated by the circumstance that he was willing to utter them. He knew

how "to labor and to wait." In science, as in morals, he not only did the things he ought to do, but left undone the things he ought not to do; and his modest, manly, thorough work presents in both respects a model for imitation.

THE COST AND PROFITS OF IRRIGATION.

Considering the large extent to which irrigation has been practiced in various countries, we are very deficient in data on the subject, and reliable records as to cost of works and the practical results are comparatively scant. The mere fact of its having been so universal a practice in nearly all countries under very different conditions of rainfall would point to advantages to be gained from it in almost any circumstances, and without going outside the United States the benefits to be derived have been amply proved. It may, however, be argued by opponents to a large expenditure from the public purse for the promotion of irrigation on a vast and national scale, that these many instances of wonderfully successful results accruing from the practice, which can be adduced, are upon a totally different scale from what is now contemplated by the vote of the last session of Congress, and have been attained under exceptionally favorable conditions.

Recent returns issued by the government of India, where irrigation works have been carried out as a part of the national policy, and upon far the largest scale of modern days, have, therefore, an especial interest for us at the present time, for we can ascertain from them the exact expenditure upon the works themselves, the direct return upon the investment and the indirect benefit to the country from increased cultivable area and crops gathered, which, of course, carries with it increased revenue to the government from general tax paying ability and improvement in the general condition of the community.

The following statistics concerning the Punjab system of irrigation works, which comprises some of the most modern operations of the Indian Government, may be taken as a sample of the general results attained in that country.

The canals in the Punjab are divided into two classes, viz., the perennial and the inundation canals; the former serving for crops at any period of the year, and the latter for only one crop, following the rainy season. The oldest perennial canal is the Western Jumna, on which, at the end of 1888, there had been expended at the present exchange of the rupee, about $3,591,276. The receipts for the past year amount to about $463,672, and the working expenses to $195,275, showing a net return on the capital expended of about 7½ per cent. It is necessary to explain here, says the report, that the old Western Jumna Canal has been entirely reconstructed and extended, the new Sirsa branch being at present under construction. Prior to this reconstruction the old Western Jumna Canal was repaying the Government of India 25 to 27 per cent. on the original capital outlay, from which we conclude that at present there is a large amount of unproductive expenditure included in the capital account. The area irrigated during the year was 237,821 acres, which, it is stated, will be vastly increased when the new branch is completed. The duty per cubic foot of discharge was for the harvest crop 108 acres, and for the spring crop 48 acres.

The estimated value of the crops irrigated by this canal was about $4,461,574.

So the list goes on through the five perennial canals of the Punjab, with the result that there has been a total investment of about $22,330,000, that already there is an irrigated area of 1,210,667 acres, and the value of the crops raised last year amounted to about $14,287,000.

The difference in most cases between the duty of a cubic foot of discharge for the two crops, being as a rule much greater for the spring than for the harvest crop, arises from the fact that the harvest crop consists of sugar-cane, rice, cotton, indigo, millet, etc., requiring constant and deep irrigation, whereas the spring crop being wheat, barley, etc., requires but little water. The net return upon all the capital expended is already 4 per cent., which may be looked upon as a wonderful result, as so large a proportion of the capital is still unproductive. The most important of all the group, the Sirhind Canal, which is 542 miles long and accounts for more than half the capital, was only opened in 1884, and upon its acreage of 390,965, full rates are not yet charged, as the people have to be educated to take the water.

With regard to the inundation canals, the returns in some cases are still more extraordinary in consequence of the large area irrigated with a small capital outlay, but unfortunately we are unable to give complete statistics, as in the case of the older works of this nature no proper account has been kept of the capital expenditure. In two cases in which the expenditure has been accounted for, the net returns are 171 per cent. and 60 per cent. on the capital respectively, the area irrigated in the former case being 297,595, and in the latter 16,812 acres.

We have given the foregoing figures, not as an argument in favor of government interference in similar work in this country, but simply as reliable data for private enterprise to consider when the work of survey now in hand under Major POWELL is completed, and comprehensive schemes for separate systems can be mapped out upon an intelligent basis

EXCAVATING BY HYDRAULIC POWER.

The question arose recently of the possibility of cutting a ditch through clayey soil by means of water. The distance was seventeen miles, and the possible grade none too high to carry the water. If it were on a one-quarter of an inch a rod grade, the fall in one mile would be about six feet eight inches. In a properly graded sluice this would give a velocity of something like six or seven miles an hour; but in a ditch the velocity might be killed by irregular grading. It is perfectly possible to lose three inches here, six inches there, and maintain a steady flow of about one or two miles an hour in an earth ditch, having a fall which would theoretically give a velocity much greater.

The proposition under consideration was clearly expressed, but it omitted a number of factors which would have to be taken into account, the main point being a simple one—whether a ditch could be economically cut by hydraulic means through a stiff, clayey soil.

Among the difficulties we may cite the following:

1. The nature of the soil. This is described as from 6 to 75 feet of "putty" clay. Every engineer who has had experience in hydraulic mining knows that clay is very hard to cut by water power, though when once broken down and in suspension it may be easily floated and moved in sluices of light grade, provided the material is not so pure as to ball up in the sluices. The pipe clay of the gravel mines gives more trouble in hydraulicking than bowlders, decomposed slate, rotten granite, stumps of trees, etc. It is also hard to break up by blasting before being washed down, as can be done with the apparently more refractory cement gravel. Such material as clay may be easily picked and shoveled, and yet may resist the "giant" nozzle to a surprising degree. It may also prove refractory to the blast, just as paper in book form resists the rifle bullet or soft ingot copper stops the cold chisel. A high head would cut quicker than a larger volume at lower pressure.

2. Cost of preliminary operations and plant, which would be useless after the completion of the main line. This would involve probably several miles of supported fluming, trestling, cuts, and piping more than the full length of the main ditch, with perhaps a good deal of auxiliary ditching. To save the grade, in order to have fall enough where applied in excavating, this auxiliary supply line would have to be carefully constructed and leveled. Its cost could not well be placed at less than $1 a running foot, or say $5,000 a mile, for carrying 1,000 ten-hour inches, which would be the least quantity to work with effectively. Here the question arises, Why not put the money into the main line at once, or consider the feeder (which must necessarily be run on a higher grade) as the main line itself? To cut a ditch in this way looks very much like doing double work. Then there would also be the cost of the nozzles, elevators, distributing apparatus, side dumping ground, etc., which would have little or no value after the work is done, to say nothing of the cost and inconvenience of moving and changing connections.

3. If the common hydraulic process were followed, work could only be done at one single point, and that at the lower end of the line. This would mean building the preliminary water-way through in advance of starting the main ditch. If such a scheme as the use of "hydraulic elevators" be resorted to, the work could go on simultaneously at perhaps three or four points with a 1,000-inch flow, but still very slowly.

4. The foregoing considerations imply very slow work indeed, a great loss of time, loss of interest on capital, large office expenses relative to actual work, and many other disadvantages.

5. The cross-section and profile of a ditch cut by hydraulic power would be extremely ragged, and it would have to be lined up by hand.

6. A certain amount of work could be done in winter in the ordinary way, by under-cutting below the frost line, when any hydraulic system would be useless because of freezing in the locality under consideration.

A new system of hydraulic excavating has recently been patented, but is yet untried. The methods in actual use may be grouped under two heads: (1) excavation by the nozzle (the common system of hydraulicking), and (2) the use of the "hydraulic elevator." These have been fully described in the columns of the ENGINEERING AND MINING JOURNAL, in Raymond's reports on the mineral resources west of the Rocky Mountains, in Vol. XIII. of the Tenth Census series, in A. J. BOWIE'S work and in other publications.

The first of these systems—by employing "giant" nozzles—is the one commonly used. It requires a high head (very few mines working with less than 100 feet fall from pressure-box to nozzle, and some taking 250 feet or more); it also requires ample dump room behind, and a grade of something like four inches a rod in the discharge sluice, to safely carry away the washed dirt, gravel, bowlders, etc. The feed water is usually carried on a one-quarter inch per rod grade, or 6 feet 8 inches per mile. In the great mines this system accomplishes wonderful results. With a 250-foot head, a 20 or 22-inch pipe, a 3,000-inch flow, and an 11 or 9-inch nozzle, gravel of easy character is melted down at a surprising rate. The expense has run as low as 2 cents per cubic yard of material moved, as was the case in the famous North Bloomfield record. But it should be remembered that the mines which have made

these exceptional showings are only the few big ones, equipped with the best of plant, costing from $100,000 up into the millions of dollars, and working on high banks of loose gravel. The results obtained in this way are entirely misleading when used as a basis for calculation in smaller mines. Sometimes open cuts are made for ground sluices in hydraulic mines through barren or low grade gravel, but these are always short and run out of grade very quickly. In each case the work has to begin at the lower end, and it is usually paid for in part by the gold extracted; and such work is also generally restricted to mines which are already provided with suitable water power and plant.

Hydraulic elevators are employed in a few localities, where there is no grade for a dump. Such places are where a shallow but rich deposit exists in a nearly level valley. The principle of the apparatus is a combination of the hydraulic nozzle with the injector of the steam boiler. A specially shaped nozzle plays into the mouth of a larger carrying pipe, and as the rush of water runs into the latter and thence over the rim of the cutting, it takes with it dirt, gravel, and even small bowlders. The material is either broken down by a second nozzle or by hand and blast. Pumping is usually necessary, on account of leakage. The process is very slow, and is applicable only on very rich gravel. It could hardly be used for the mere purpose of opening out a cutting in barren material apart from the development of a placer mine. In using the "hydraulic elevator" the waste material can be dumped alongside, and work can be done at more than one point on the line, which are, of course, advantages, as compared with the common hydraulic method.

NEW PUBLICATIONS.

STEAM ENGINE DESIGN, FOR THE USE OF MECHANICAL ENGINEERS, STUDENTS AND DRAUGHTSMEN. By JAY M. WHITHAM. Published by John Wiley & Sons, New York, 1889. Cloth, 8vo., 391 pp., including contents and index. 210 illustrations. Price $6

Professor Whitham has had abundant experience in his practice as a navy engineer, and later as Professor of Engineering at the Arkansas Industrial University, to be well fitted for the task he has now so successfully carried out. There are many works on the steam engine, and many excellent ones, as might be expected. To say, then, that this volume is in the first rank of its class is expressing a high opinion. The scope is a wide one, the aim of the author being to treat of the application of the principles of mechanics to the design of the parts of a steam engine of any type for any duty. Of course there are special works dealing with particular types of engine, and the best of these must and will be consulted by the designer; and there are also many books which are intended to assist each of the classes of men who have to deal with the steam engine. For a general treatise, in a reasonable-sized volume, a great deal of ground is covered. The illustrations are profuse and well made, but many of them could be more handily used if dimensions were given with the plates. The typographical work is excellent.

NOTES ON THE TREATMENT OF GOLD ORES. By Florence O'Driscoll. Published by *Engineering*, London, and by John Wiley & Sons, New York. Cloth, 8vo, 200 pp., including index. Price, $2.

This very handsome volume is, the reader must confess, somewhat disappointing. The best feature about it is the systematic arrangement of topics, and the very clear manner in which everything is expressed. As the author says that "no pretension has been made to treat the subject exhaustively," it may seem captious to complain of omissions, but when such omissions are of matter which would have been of the highest importance and interest to mill men, and at the same time space has been given to descriptions of obsolete, ineffective and abandoned methods, then a fair ground for criticism is opened. Mr. Driscoll has endeavored to avoid prolixity, and so far as his system of "boiling down" is concerned, he is to be commended as a bright and shining example for future makers of technical books; but his success in compiling a well-balanced book is very dubious, in view of of sins of omission and commission, which most decidedly do not offset each other. The prefix "Notes" does not harmonize with the ideas set forth in the introduction as to what is to be given in the text. For example, it is stated (page 66) that "from forty-five years back to the present the teachers, workers and patentees [in gold metallurgy] appear to have followed each other in the order set out below." Excluding the names of foreigners, let us take from the author's citations the American names only. They are:

1852. Spicker, C., patent 8,729.
1858. Deetken, G. F.
1863. Deetken, G. F., patent 37,278.
1871. Phillips, J. S., "Metallurgists' Companion.
1877. Mears, Dr. J. J. H., patent 195,381.
1879. Mears, Dr. J. J. H. (reissue), 8,859.
1880. Mears, Dr. J. J. H. (reissue), 9,203.
1880. Schaeffer, C. A., patent 267,723.
1880. Mears, Dr. J. J. H., patent 269,441.
1881. De Figaniere, patent 267,842.
1882. Evans, N. F., English patent 1,063.
1884. Munktell, H., English patent 16,135.

Or eight names, of which only two will be familiar to most of our readers, while one other (J. S. Phillips) is included because he published a book in San Francisco. The list might include two more names (unknown to us) of non-residents, who have taken out United States patents. The foreign list is in proportion to this. Does Mr. Driscoll imagine that prominence in metallurgy is based on patents? Most metallurgical patents are secured by people who are ignorant of the history and existing condition of the art, and it is rarely the case—perhaps five times in a hundred—that the patent is not absolutely futile and absurd. It would be easy to enumerate offhand twenty-five or more Americans who have directly advanced the metallurgy of gold by suggestion, invention, experiment, practical working and publication. By a little overhauling of the files of the ENGINEERING AND MINING JOURNAL and other technical periodicals, the *Transactions* of the American Institute of Mining Engineers, reports of the Commissioner of Mining Statistics, and knowledge of the many busy men unknown to fame, because they have never had time to publish, and whose improvements have only come into the literature of the subject sparingly in proportion to their usefulness, the list of Americans who have done good work—not merely talked or written—would go far up into the hundreds. Yet Mr. Driscoll ignores them, and draws his citations mainly from mining regions which in no single branch of gold metallurgy can begin to compete with American practice.

In regard to chlorination, the author explains the comparative length of the descriptions on account of the barrenness of the literature. He says: "* * * When looking up the matter no work could be found which in any way gave a statement of its gradual introduction and use." Surely Percy, Stetefeldt, Aaron, Kustel, Hoffman, Egleston, Lock, Eissler and the many other specialists, to say nothing of the host of compilers of chemical works, technical cyclopedias and even general cyclopedias, together with the well-nigh innumerable host of unnamed patentees, will feel like rising *en masse* and going over to Ireland and mobbing Mr. Florence O'Driscoll. Yet the book has its merits withal.

The publishers are to be congratulated on the excellent typographical style of the volume.

THE METALLURGY OF SILVER, a practical treatise on the amalgamation, roasting, and lixiviation of silver ores, including the assaying, melting and refining of silver bullion. By M. EISSLER, London, 1889: Crosby, Lockwood & Son. 8vo., cloth, 336 pp., including index. Illustrated. Price $4, of Van Nostrand & Co., or the Scientific Publishing Company.

This book, like all the rest of its kind, is both good and bad. The good parts consist in the description of actual practice, and in suggestions for meeting unusual difficulties, in treating exceptionally rebellious ores, and in records of actual practice, carefully described. The bad parts are partly in (1) sins of omission in neglecting recent advances in machinery and practice, and (2) sins of commission in repeating obsolete and defective methods, which have been abandoned and thrown into the waste heap of processes, alchemic, magical or pseudo-chemical. As in other works of a similar nature, Mr. Eissler's compilation embraces a number of things which would be of great practical utility to any one who is capable of distinguishing the wheat from the chaff. For a student, a beginner, such compilations are deceptive. The recitation and repetition of old methods and appliances may be interesting, but they are certainly not instructive, except in the negative sense of "how not to do it."

Mr. Eissler's book is in the main evidently a compilation of Raymond's series of reports on the mineral industries west of the Rocky Mountains, and of J. D. and Arnold Hague's work in the survey of the fortieth parallel, superintended by Mr. Clarence King. To the Raymond series, the articles by Prof. W. P. Blake and other experts, have been gleaned upon. The work might have a still further historical value if the *Transactions* of the American Institute of Mining Engineers, the reports of the Director of the Mint, the "Mineral Resources of the United States," and occasional papers in the ENGINEERING AND MINING JOURNAL had been consulted. As Mr. Eissler has compiled his book it looks rather "chestnutty." When a man nowadays describes the old Rittinger tables of forty years ago, the Freiberg barrels of thirty years past, the patio process of the back districts of Mexico and Central America, and the many crude systems still in vogue in some of the out-of-the-way camps, he is not helping the workers, but simply adding to the already cumbersome literature of the subject. Every mill man who has any experience at all will be able to gauge the merits of any book suggestions, and can separate the probable and possible from the cranky. In this sense all contributions to the literature are acceptable.

If Mr. Eissler had taken the trouble to have his revises reviewed by experts, or had looked them over in the same way that he would edit other people's matter, the book would have been more successful. For example, Mr. Eissler tells us that when a pan charge is too diluted, so that the "quick" will not circulate, the usual practice is to let the charge evaporate. Imagine hanging up a pan, even with a steam bottom, for a fortnight, while the pulp thickens! Any common laborer about a mill would hit on the right and simplest remedy—to shovel in more heavy pulp. And when Mr. Eissler, in describing the battery, gravely tells us that the shoes and dies are usually of white iron, he is not only behind the times, but is misleading. In the same way he describes the material of screens as being usually of brass wire, and stems, cams and tappets as being of wrought iron. The art of silver reduction has not progressed much in the last twenty years, progress having been made in the way of improving details of shape and material; and this progress, while not large, may yet make the difference between profit and loss in a long campaign. There was a time when the rebellious ores of Austin and Mineral Hill could not be milled at a profit if they ran under $100 per ton. Now, the same class of ores can be mined, roasted and amalgamated at about $7 to $12, the difference being in cheaper freights, handling, fuel, labor, etc., rather than in any advance in metallurgical art, and yet these details (which Mr. Eissler ignores) may make up 25 per cent. of the difference.

A complete treatise on silver metallurgy is yet to be written—if, indeed, it is possible to compile a book of the kind which shall be within the compass of a six volume folio set, and edited up to within ten years of date of issue. Locke has tried the experiment of printing everything under the sun bearing on gold and the metallurgy of gold, and the compilation would be of value to any skilled metallurgist who would be able to eliminate the nonsense from the practical part. Dr. Percy aimed at a middle course, and gave a certain quasi-authority to all the statements and descriptions in his series. Others, like Mr. Eissler, have endeavored to narrow down the selection of topics to the limits of a small book. If any one is desirous of obtaining a good working library of mining or metallurgical books he will probably find the most useful ones to be on special subjects, as, for example, on the steam engine, on roasting, on leaching, on assaying, etc. In the condensed form of publication the author is merely a recorder of past experiments, and cannot claim to be an authority. With the exception of steel, silver metallurgy is undoubtedly the most complicated of all branches of the art.

One feature in Mr. Eissler's work is worthy of special commendation—in which he differs from most commentators. This is in stating the theories and explanations of others with a certain amount of hedging. For example, the reactions in the patio process are put in a very safe way, for the old equations are rather dubious, and when we come to the possible reaction in the Washoe pan process the author is still more non-com-

mittal. Here we have two kinds of metallic iron, quick,silver salt, copper sulphate, and in the ore sulphides, antimonides, arsenides, bromides, iodides, metallic silver, and as bases copper, lead, zinc, iron, cadmium, and all of the alkalies and alkaline earths—so that there are an infinity of possible reactions which can be imagined. If one works out the problems on the Berthelot plan of thermo-chemic reactions, that the final result is the one which develops or absorbs the greatest number of heat units, he will have the choice of some two hundred series of equations. At least that was the number reached by one experimenter in investigating the true inwardness of the matter, the final outcome being as problematical as before the calculations were begun.

Mr. Eissler has made a good point in frowning upon the indiscriminate use of "chemicals" in amalgamation. Every mill man knows now that sage-brush extract, tobacco juice, etc., are not efficaceous reagents; yet Mr. Eissler himself advocates the use of free sulphuric acid in dippersfull to oxidize chalcopyrite to bluestone. If some of our mill men would set five or ten stamps, two or four pans, one or two settlers and one agitator to work on amalgamation *without* chemicals, repeating on the larger scale the experiments of Mr. Arnold Hague, they would probably find that the supposed "medicines" could be suppressed without being missed. To add a few ounces, or even up to four pounds, of bluestone in a 2,000-pound charge seems ridiculous. If the experiment is tried in a glass beaker, with salt and a little scrap iron on the bottom, it will be found that all the copper is at once precipitated in the metallic state on the iron, and not reduced to subchloride from dichloride, as the most commonly accepted theory requires. And after chloridizing, roasting with the use of 5 to 8 per cent. or more in the furnaces, it seems absurd to add salt again in the pans, as Mr. Eissler did at Mineral Hill. There is almost always an excess of salt, and such excess is detrimental in two ways: by consumption of mercury as calomel, and by leaching out the silver chloride into the pan slimes.

Still, with its defects, Mr. Eissler's book is a good one. It contains a good deal of hitherto unpublished records, and bears on every page the mark of the experienced metallurgist, not a mere maker of books.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Value of the Machinery and Supply Column.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: * * * I find your innovation of apprising your readers of Machinery Wanted of great value. Yours truly,

RICHARD A. PARKER.
Mining Engineer.

MARQUETTE, Mich., Sept. 20th, 1889.

Gypsum.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As a subscriber to your paper, I have been unable to find any article treating of gypsum mining in the United States.

I find gypsum in your annual list of mineral products, but have not been able to find out in which States it is mined. Having lately discovered a large bed of this mineral in Arkansas, I would be very thankful to you for information as to which States it is mined in, as I intend working it if competition does not stand in the way. I of course know that for the Eastern markets only Nova Scotia gypsum is used. "W. L."

[Gypsum is a hydrated sulphate of lime, its chemical composition being expressed by the formula, $CaSO_4 2H_2O$. It occurs in various geological formations, especially in tertiary deposits. In its transparent crystalline state it is known as selenite; when it presents a finely fibrous opalescent appearance it is termed satin spar, and the pure, milky white, massive varieties are called alabaster.

Production.—In this country the principal sources of supply are in Ohio and Michigan. The production of the latter State in 1887 was 54,310 short tons. The average price of land plaster was $3 per ton, and of calcined plaster $10 per ton or $1.50 per barrel of 300 pounds. Of the total product, 28,794 tons were for use as land plaster and 25,516 tons for "stucco" or plaster of Paris. In Ohio, the greater part, if not all, of the gypsum produced comes from the quarries at the station of Gypsum, Ottawa County, on the Lake Shore & Michigan Railway, ten miles west of Sandusky. According to Prof. Edward Orton, State geologist of Ohio, only twenty-five acres had been worked out in 1887, and there was then as much more territory that had been proved to contain gypsum in quantity sufficient to justify working. Messrs. Marsh & Co., of Sandusky, own and work this territory. In Ohio the annual output is about 20,000 tons of stucco and 16,000 tons of land plaster. The manufacture of stucco or "plaster of Paris" from the large deposits in central Kansas, at Ashland and near Comanche City, and on the north side of the Cimarron River, along the line of Clark and Comanche counties, has also assumed considerable proportions. In Colorado, the Colorado Stucco, Brick and Cement Company, of Colorado City, supplies the demand. The gypsum of the Black Hills, Dakota, which until recently has had only a local consumption, has now begun to have a wider market. On the Pacific Coast, the Golden Gate Mills of San Francisco turn out about 2,500 tons of gypsum annually. The total production of crude gypsum in the United States in 1887 was 95,000 tons, valued at $425,000.

Uses.—Of the annual output about 60 per cent. is used as land plaster, and 40 per cent. in the manufacture of "stucco" or plaster of Paris. As land plaster it has an extensive consumption for fertilizing purposes. Sulphate of lime enters into the composition of grasses, potatoes, turnips, etc. And these rarely flourish in soils entirely free from it. Manufacturers of artificial fertilizers consume large amounts of it. It gives weight to their products while its absorbent qualities enable them by its use to improve the work of other constituents of the fertilizer. The inferior grades of flour are largely adulterated with it, and it is also mixed with coloring materials under the name of terra alba. It has some use in the conversion of carbonate of ammonia into sulphate of ammonia.

As plaster of Paris, so called from the fact that originally its manufacture was carried on in several Parisian suburbs, it has many and varied uses. When calcined, its combined water is driven off. If then ground to powder and again mixed with water, this water recombines with it, and the mass becomes first plastic, then solid, and takes the form of any model into which it may have been poured. Its use for plaster casts is common. It is employed as a filling for fireproofing purposes. Potters make the molds for their white and porcelain ware from it, and makers of terra cotta often use it for a similar purpose. The molds used in making elbows, curves, etc., in sewer-pipe manufacture are made from it. It makes excellent material for sculptors' models, lay figures, etc. Surgeons employ it to confine the parts of a broken limb, and dentists to take casts of the mouth or teeth. One of its chief uses is for plastering walls and ceiling and in making cornices and other work of interior decoration. It is one of the ingredients of blackboard crayons. When mixed with other substances, such as alum, potash and borax, it forms several well-known brands of cement. Miners and quarrymen sometimes use it as a material for tamping blasts. Where it is thus used, its advantage is claimed to be that no tamping bar is needed and there is little danger of premature explosions.

Mode of Treatment.—The best rock is calcined. All that is streaked with shale or from any other cause is off colored, is turned into land plaster. A comparison of analysis of Ohio calcined plaster and Michigan land plaster is as follows:

	Ohio calcined. Per cent.	Michigan land. Per cent.
Lime	32·52	32·25
Sulphuric acid	45·56	46·38
Water	20·14	19·70
Magnesia	0·56	0·54
Alumina	0·16	0·60
Insoluble residue	0·68	0·91
Totals	99·62	100·48

For making plaster of Paris the process is simple. By the application of heat gypsum begins at a temperature of about 175 degrees Fahrenheit to part with its combined water. An increase of temperature causes the desiccation to proceed with great rapidity, and the best results are obtained at from 230 to 250 degrees. For plaster of Paris, gypsum is therefore burned in kilns at about the latter temperatures, and subsequently powdered and ground to a uniform flour.

Condition of the Market.—Calcined plaster from Ohio and Michigan reaches the general markets of the country as far east as Pittsburg and Buffalo, and southward indefinitely. The land plaster is largely used in Michigan, but Ohio farmers do not accord so large a use to it. The average price in Michigan in 1887 of the calcined plaster was $1.28 per barrel, and of the land plaster $3.87 per ton.

The Eastern market is supplied mainly by Nova Scotia gypsum, which is sold at about $5 or $6 per ton delivered in New York.

In conclusion, in answer to our correspondent's questions, we would say that a good quality of gypsum in Arkansas should find a market either in Kansas or in Iowa, where, we believe, a factory, whose address we have been unable to obtain, is in operation. Dr. Workman, of Ashland, Kan., may be able to give further information.—ED. E. AND M. J.]

The Mexican Ore Question.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: W. J. Chamberlain & Co., of Denver, Col., in their circular of August 18th, have sent broadcast all over the country the following sentence:

"The Mexican press are howling and wailing over this detriment to Mexican development, and seem deeply grieved at the fact that so many American dollars will now be turned into American pockets in place of being diverted to build up Mexico."

Never was a firm more mistaken both as to English grammar and ore matters. It would certainly be a brand new departure in political economy to state that the taking of the gold and silver of Mexico in exchange for New York pumps, St. Louis boilers, McAllister coal, Pennsylvania coal oil, Singer and Domestic sewing machines, Pueblo Istle breakers, Milwaukee beer, Texas flour, Louisiana lumber and California powder, which is what was happening here one month ago, was taking the money out of American pockets to build up Mexico. This would be all the more wonderful when we reflect that Mexico sends this gold and silver in the shape of ore, accompanying it with lead enough to flux it and cash enough in addition to pay our American workmen for treating it at a good profit.

It would be interesting to know if Mr. Chamberlain can substantiate his statement with any facts or arguments tending to show that he is correct.

This camp produces a value of about three million dollars a year of dry (or non-leaded) ores, and up to within ten months ago scarcely a dollar of this money ever reached the United States. Everything, from a little vial of podophyllin pills to engines and drilling machinery for driving tunnels, was brought from Europe—even the workmen for the latter came all the way from the Mont Cenis Tunnel under French direction. Belgian rails, French ore cars, English tools, and German medicines stare one in the face at every step, and, the Lord knows, much of it is ugly and clumsy enough to call for conspicuous notice anywhere. Just over my office, right now, is a Spanish lady playing on a piano which rejoices to have been made by "Collins & Collins," London, England. It took thirteen months from the date of the order to get this piano here. How long would it have taken to get a Steinway from Denver? About fifteen days. They would have preferred the Steinway, but didn't know how to get it and pay for it.

But the last ten months has produced somewhat of a change. The ore buyers from the United States put in an appearance, and after considerable persuasion succeeded in getting the mine owners to sell them some ore. They thus created a fund in the United States on which the people here could draw. This was the first step. They next made suggestions, recommended good engines and improved machinery, told the mine owners where they could get them, how much they would cost, and in what manner they could get the money placed to pay for them. The result has been that, for $300,000 paid for ores with no lead in them, more than $50,000 has gone to the United States for flour, lumber, beer, machinery, etc. This shows a pretty good opening in ten months' time with perfect strangers, and simply proves that the old saying, taken from Shorthorn's Political Economy (still unpublished), is still true, viz.: "If you want to trade with an unsophisticated stranger, buy something from him first and

then open your wares." The Mexicans are by far too polite and gentlemanly not to return the compliment.

This sending of ore to the United States is now stopped by the action of the United States Government, and if the Secretary of the Treasury and the dignified Congress assembled will be kind enough to explain how these people are to buy American goods without creating a credit to pay for them, we will all of us be sincerely obliged to them, for if the ore continues to be treated here, the bullion then goes to the mint, is coined and deposited with some large German or Spanish house in San Lius Potosi or the City of Mexico, and after that it is contrary to all their business training and principles to let Uncle Sam get any of it.

Right here comes a view of the matter which seems to be decidedly overlooked, and that is that this gold and silver ore is, in fact, money, and the Secretary of the Treasury is actually protecting the people of the United States against the importation of cash, something that our revered ancestral legislators certainly never intended to accomplish by any of their laws, however worded, and surely a ruling of which even a Chinaman wouldn't be guilty.

The soft lead which went with this ore must not be regarded as lead in this connection. It is simply a tool, an implement, a solvent, reagent, adjutant, helper, flux, or whatever else you may choose to call it, which has been discovered to be the most effective and economical extractor of gold and silver from their ores; and to exclude this stops the gold and silver ores, and, stopping them, stops the gold and silver in any and all forms, as can be seen here to-day. The gold and silver ores must in future always keep with this soft lead, no matter what Congress may do, nor how much the press may wail, because if sent off alone they lose so much of themselves they won't "pay their keep."

I don't know what the press of Mexico is saying about the matter, as none of the howling and wailing articles referred to have been published around here, nor do I apprehend it is of much importance what the press does say; but I do know what the men who are producing and control this output of three millions a year think and say about this exclusion of their ores from the United States, and I assure you that without exception they are glad of it. They are wealthy, conservative, broad-minded, educated gentlemen, and do not hesitate to say that its effect will be to establish smelters here and build up Mexico, and they are now ready to put their money in the business. Ten months of experience with soft lead, fire and machine blowing have shown them that their native methods can be much improved upon, and as they have the dry ore here, the lead near by, and can get skilled labor from the United States, it is but a short step to the conclusion that after a few trials and breakdowns they can smelt ores here for nothing per ton, as some of the Colorado smelters are doing now. When they reach that point I should like to know how the United States is going to get any of this gold and silver, even if the doors are thrown wide open.

By the by, whenever your influential journal has succeeded in getting any government official or member of Congress to thoroughly understand how all the gold, silver and lead in a ton of ore can be paid for, and no charge made for the labor of taking them out and separating them, the remainder of the argument is a simple "walk over."

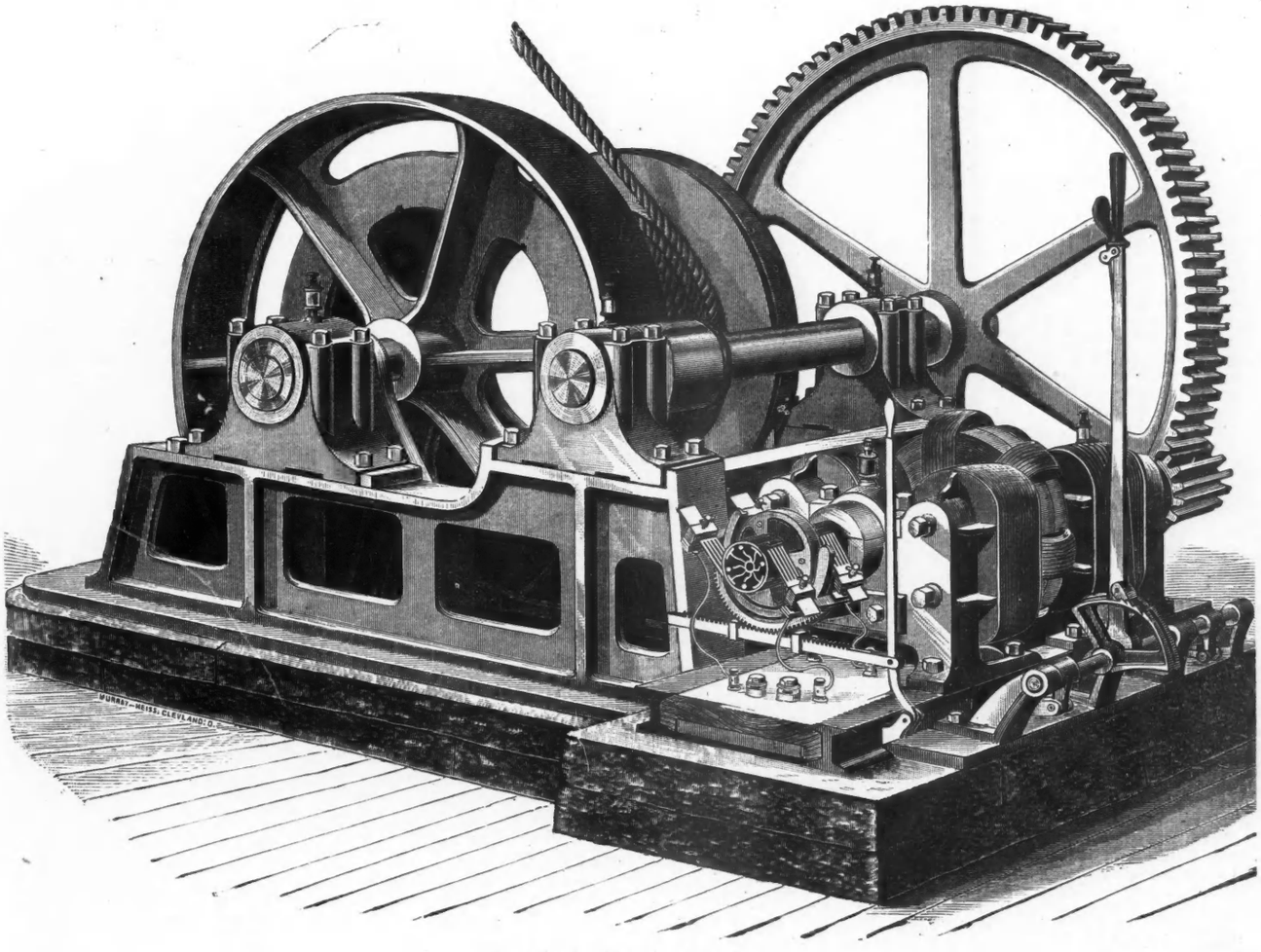
The outcome of Mr. Chamberlain's movement is, that the ore buyer puts his money actually back into his own pocket, and keeps it there until he can look around and find a profitable investment; and the ore buyer is much more likely, if he still has a hankering after ore and mineral exchanges, to commence putting up a smelter in Mexico, or arrange contracts for sending ore to Germany, than make a doubtful investment of his capital with anybody else. I know several of the most intelligent ore buyers who have done the former in the last two months.

What I have here stated is fact—facts that are, not "facts that will be" (as Mr. Chamberlain says), which latter class of questionable gentry seems to be a new species recently discovered by Mr. C. or his Co., entirely unknown to Webster's dictionary, and scarcely susceptible of being accurately defined, or parsed or located in any intelligible manner, though very likely fit associates for "a press that are."

In my next I will give you some suggestions as to the best methods of promoting trade with Mexico, accompanied by as many "facts that will be," as I can conveniently manufacture, prophesy, or stumble on, or glean from Murray's English grammar dictionary edition of Colorado circulars.

Truly yours,
J. H. WATTS, A. M., C. E.; E. M.

CATORCE (STATE OF SAN LUIS POTOSI), Mexico, September 10th, 1889.



THE BRUSH ELECTRIC HOIST.

BRUSH ELECTRIC HOIST.

The Brush Electric Company, of Cleveland, Ohio, has devoted considerable attention to the adaptation of electricity as the motive power for mining hoists as well as the other branches of mining work. We illustrate herewith the electric hoist as arranged by this company for mining and other work, which is fitted with spur gear, and is operated by a 15 horse power motor. The motor is mounted on the same base as the hoist, and takes up very little space, thus making the whole arrangement very compact. As showing how highly this class of work is appreciated by the foremost of our mines, we may mention that the Calumet & Hecla Company have recently contracted with the Brush Electric Company for the supply of five 80 horse power motors and five 130 horse power generators.

PROGRESS OF METALLURGICAL SCIENCE IN THE WEST.

By Richard Pearce Argo, Colo.*

(*Concluded from page 249.*)

I will now return to the description of the process at Argo.

The roasted ore is mixed with others, principally siliceous, and the mixture is so arranged that, when smelted, it shall yield a slag containing, as near as possible, 40 per cent. of silica, and a first matte (ore-metal), which assays 40 per cent. of copper, 400 ounces of silver and 6 ounces of gold per ton. The capacity of each furnace is about 25 tons of ore per day, the total burden being 27 tons, on account of rich slags that are added from other operations.

The degree of concentration in this first smelting is about 13 into 1.

The composition of the slags, so far as the bases are concerned, is subject to many changes. The silica ranges from about 38 to 42 per cent., and no lime or flux is used other than what may be contained in the ores.

EXAMPLES OF TYPICAL SLAGS.

	I.	II.	III.	IV.	V.	VI.	VII.
Silica	40.96	39.80	41.62	37.42	39.42	36.52	41.73
Protoxide of iron	28.30	29.40	28 26	33.00	31·41	30.68	33.08*
Alumina	2.96	4.35	4.84	3.63	.....	1 29	.....
Oxide of Manganese	7.16	5.53	5 03	3.72	4.53	4.46	3.96
Oxide of Zinc	9.10	11.03	7 87	11.47	13.46	20.08	9.72
Lime	7·08	7.60	5.59	5.01	5.52	3.57	6.02
Magnesia	0.76	0.94	0.58	trace	.....	.....	1.34
Copper	0.39	0.62	trace	0.42	0.40	.....	.....
Lead	0.42	0.24	3.31	3.78	.....	.....	.....

* Including alumina.

III. and IV. are slags from smelting ores containing lead.

VI. slag produced from ores containing much zinc.

The ratio of the oxygen in the base to that in the silica is 1 to 1·5, and the slag would be classed as a sesquisilicate.

Since these slags all show distinct magnetic properties, we may assume that a portion of the iron exists in the form of magnetic oxide. The oxidizing conditions of the laboratory of the furnace will account for this peculiarity in the slag, as, at the end of the operation, the reducing action of the sulphur and sulphurous acid ceases, to a certain degree, to be active.

The slags were all produced some five years ago, but they represent nearly the composition of the slags made at this time, except that the latter contain barium as an additional base, since Aspen ores have come into the market.

The matte which is produced in this first operation of smelting consists mainly of copper, iron and sulphur, but when, as is sometimes the case, lead is present in the ore, a portion of this metal replaces the iron in the matte. This frequently occurred in former years, before care was taken in the assortment of the ores. An example of this copper-lead matte is given in the following analysis:

	First matte (ore metal.) Per cent.	Probable composition of first matte. Per cent.
Copper	32.03	Cu_2S 39·85
Lead	26·60	PbS 30·47
Iron	9·50	Fe_2S_3 17·51
Zinc	4·29	Zn S 6·36
Silver	1·92	Ag_2S 2·18
Gold	6·05	Au 0 05
Sulphur	21·70	
Insoluble residue and traces of other metals	3·58	Insol. residue and traces of other metals. 3·58
	99·67	100·00

This is merely given so show to what extent lead may enter into the composition of the matte without seriously interfering with the subsequent treatment. It may be of interest to note the results of some assays from two samples of matte from one large tap, representing about 7 tons. When broken, the mass showed a section of about 12 inches, the upper part of which varied considerably from the lower. The upper portion was of a very close texture, and the lower crystalline and vesicular.

	Copper. Per cent.	Lead. Per cent.	Silver. Oz per ton.	Gold. Oz. per ton.
The upper portion contained	38·6	18·9	543	8·4
The lower portion contained	31	37·1	760	18

The ratios between the quantities of lead, silver and gold in the two portions are approximately as follows:

	Lead.	Silver.	Gold.
Upper portion	1	1	1
Lower portion	2	1.4	2

One great objection to the existence of lead in large quantities in such mattes is, that a compound of lead, copper, iron and sulphur is formed, still richer in lead than the original matte, which, from its extreme fusibility, finds its way into the hearth of the furnace. It is often found in lustrous crystalline plates, having somewhat the structure of spiegeleisen, and corresponding in composition very closely to the following formula:

$$5\,(Cu_2S) + 4\,(PbS) + Fe_2S_3.$$

An analysis of this substance gave:

	Per cent.		Per cent.
Copper	32·60	Silver	2·56
Lead	40·52	Sulphur	19·97
Iron	5·02	Total	100·40

I may state here that this first matte always contains a certain amount of lead, but the quantity rarely exceeds 10 per cent.

I pass on to the next stage in the process, which includes the roasting and concentration of the ore-metal, or first matte, to "white metal" containing 60 per cent. of copper.

The charge in this operation of smelting consists of a mixture of two-thirds of roasted metal and one-third raw metal, together with rich siliceous silver-ore in quantities sufficient to prevent corrosion of the furnace by the iron present in the matte.

The concentration furnace in which this operation is performed stands some three feet above the level of the ore furnace, in order that the rich slag from the former may, when skimmed, flow directly into the ore furnace, where it is cleaned and reduced to the condition of ordinary ore-furnace slag. This effects a very great saving in the re-smelting of these rich slags.

The white metal from this concentration-smelting contains, on an average, from 700 to 800 ounces of silver and 10 ounces of gold per ton and 60 per cent. of copper. Each ton of this matte represents from 20 to 21 tons of ore.

This white metal is now ready for the extraction of the silver, which comprises the following operations:

Rough roasting.
Fine grinding.
Fine roasting for sulphate of silver.
Leaching, and the precipitation of the silver.
Refining and melting of the cement silver.

The metal, crushed so as to pass through a screen of six meshes to the linear inch, is roasted for 24 hours. The bulk of the sulphur is driven off in this operation, and oxides of copper are formed, the mass still containing sufficient sulphur for the subsequent operation of roasting for sulphate of silver. After cooling, the roasted material is ground fine in a Chilian mill and passed through a 60-mesh screen. It is then ready for the fine roasting and conversion of the silver into a sulphate.

ROASTING FOR SULPHATE OF SILVER.

This operation, based on the principles first pointed out and carried into practice by the eminent Ziervogel, is, perhaps, one of the most interesting and most beautiful of all the metallurgical processes ever discovered. The chemical changes involved in the operation, so far as they are understood, have been described again and again, and I will only briefly refer here to the principle stages in the roasting process.

It must be understood that the process is a delicate one, and requires to be watched with great care in order to arrive at good results. The whole operation extends over a period of about five hours from the time the charge is placed in the furnace until its withdrawal.

The *first stage* is conducted at a low temperature, and lasts about one and a half hours. The finely-ground material begins to glow from the oxidation of any copper disulphide and copper dioxide that may be present.

Second Stage.—Slightly increased temperature for one and a half hours. Material increases in volume, and assumes a porous, spongy appearance from the formation of cupric sulphate.

Third Stage.—Temperature further increased for one hour, or until sample treated with water shows the silver to be what is termed "out," which means that it has been changed into a sulphate. The presence, at this stage, of a quantity of dioxide would, during the operation of leaching with water, reduce the sulphate of silver to metallic silver, the latter showing itself in beautiful spangles.

Fourth Stage.—Charge is vigorously stirred and turned over to present fresh surfaces for oxidation, the temperature being kept as in the third stage. This stage is purely for the pupose of completely oxidizing any cuprous oxide, so that no reducing action shall occur when the material is leached.

The presence of foreign elements in the matte very materially influences the results in this operation. Arsenic, antimony and bismuth form insoluble compounds with silver. Bismuth is found to be most injurious, and gives more trouble than all the other metals together. An insoluble sulphate of bismuth and silver is probably formed, which increases the richness of the residues in silver.

In the absence of large quant ties of these metals, or with what might be considered fair average matte, the residues will contain, after leaching, about 40 ounces of silver per ton; but as these residues are subjected to a further treatment, the question of a few ounces of silver, more or less, makes very little difference in the final result, as will be explained.

The leaching of the roasted matte is effected in tubs, and nothing but hot water is required. The solution, charged with sulphate of silver, is allowed to flow over copper plates for the precipitation of the silver. This process of precipitation requires little attention. The solution enters tank No. 1, charged with silver, and leaves tank No. 2, charged with copper, and containing no trace of silver. This copper solution, in its turn, flows over old scrap iron for the precipitation of the copper.

In the precipitation of the silver a certain amount of copper is found mixed with the silver in the form of cuprous oxide and of small scales and scraps of metallic copper, and a process of refining is necessary previous to melting. This copper is removed by prolonged boiling with water containing a small quantity of sulphuric acid, into which air is injected by means of a small jet of steam. Sulphate of copper is formed, which is carefully washed out of the silver. The silver is then dried and melted into bars of an average fineness of 999.

The residues, after the extraction of the silver, contain about 40 ounces of silver and 10 ounces of gold per ton, and 55 per cent. of copper in the form of cupric oxide. They also contain associated metals, such as lead and bismuth as sulphates, and iron as ferric oxide.

TREATMENT OF THE RESIDUES.

The residues are mixed with the necessary quantity of pyritous ores containing gold, or low grade silver-bearing pyrites rich in sulphur, and with silicious gold ores, and are smelted direct for matte of 65 per cent. copper. This matte contains about 10 to 15 ounces of gold per ton, and 80 ounces of silver. The slag from this operation is thrown away. It contains about the same proportion of iron and silica as the ore slag.

TREATMENT OF MATTE FOR RICH COPPER-GOLD ALLOY.

This process involves two operations, which may be described under the following heads: A combined roasting and smelting, and a refining of crude alloy.

The aim of this process is to concentrate the gold contained in the matte into a rich gold-silver-copper alloy, containing also the bulk of the impurities existing in the matte. This process resembles the old Swansea process for making "best selected copper," a description of which will be found in any of the standard works on copper smelting. As practiced at Argo, it is as follows:

Twelve tons of matte, or residue metal, are placed in slabs on the hearth of a large reverberatory furnace. The openings of the furnace are

* From the Presidential Address at the Colorado Meeting, June, 1889.—*Transactions of the American Institute of Mining Engineers.*

closed, except two large ports, which are situated near the bridge, and are used for the supply of air for oxidation. The heat is gradually increased for a period of about seven hours, or until the whole mass assumes a semi-pasty condition. The ports are then closed, and the heat is still further increased until a point is reached when the whole charge is in a perfectly molten condition. In the last stage of the melting a reaction takes place between the oxide and sulphide, and a certain amount of metallic copper is liberated. This metallic copper contains nearly all the gold, together with any foreign metals present in the matte, such as lead, arsenic, antimony, bismuth, etc. The charge is tapped into sand molds, in the first few of which, nearest the taphole, there will be found, after cooling, under the enriched matte, plates of the above-mentioned impure copper, commonly known as metallic bottoms. The proportion of these bottoms to the whole tap of matte, called pimple metal, is about 1 to 15. The following analysis will give some idea of the composition of this crude alloy : Copper, 60·04 per cent.; lead, 33·61 ; arsenic, 0·44 ; bismuth, 0·40 ; iron, 0·08 ; zinc, 0·15 ; gold, 0·54 ; silver, 1·35 ; sulphur, 1·68 ; total, 98·29 per cent.

It must be understood that this analysis shows the composition of one specimen of such alloy only. The composition varies, of course, with the nature and quantity of the impurities present in the residue metal. These impurities, without a doubt, increase the solvent action of the copper on the gold. In other words, a copper matte containing little or none of the impurities mentioned, will not yield its gold so readily to the copper. The whole operation of roasting and smelting occupies about twelve hours. The crude bottoms contain 100 to 200 ounces of gold to the ton, and about 300 ounces of silver. The compound that bismuth forms with gold, when present in this crude alloy, has been referred to in my paper on "Certain Interesting Crystalline Alloys.* The matte, pimple metal, if the operation has been properly done, contains, not to exceed 0.2 ounce of gold per ton (assays frequently show less than 0.1 of gold), 90 ounces of silver, and 77 per cent. of copper. The roaster slag from this operation is smelted in the ore furnaces.

TREATMENT OF THE CRUDE ALLOY.

The treatment of this alloy and the separation of the gold from the copper is a part of the process which, for certain business considerations, I am not at liberty to describe.

TREATMENT OF THE PIMPLE METAL OF FINISHED MATTE.

The finished matte, containing 77 per cent., of copper and 90 ounces of silver per ton, is crushed, roasted, ground fine, and again roasted to form sulphate of silver. In fact, it is treated precisely in the same manner as the rich silver matte described in the Ziervogel process. The only difference is, that the treatment is conducted in a separate set of furnaces, as the matte contains no gold. The residue, after leaching, consists almost wholly of oxide of copper, with an amount of silver not exceeding 10 ounces per ton. This oxide of copper is dried, packed in barrels and sold to the manufacturers of sulphate of copper, or reduced to black copper by melting with fine slack coal in a reverberatory furnace. This copper is refined in Massachusetts and disposed of in the eastern market in the form of ingot copper.

At this point let me refer for a moment to some important improvements which have been recently introduced in Montana in the treatment of copper ores. The old, slow and costly method of roasting in calciners is being replaced, with great success, I learn, by very capacious revolving cylinders. In a country where fuel and labor are dear, a change of this nature is of immense advantage, when large quantities of ore have to be roasted before smelting. Transferring the hot ore direct to the furnace, instead of allowing it to cool before charging, is also a very important gain, as it greatly increases the capacity of the furnace.

While Colorado may be said to lead in its successful development of the lead industry, Montana has come to the front and has made a great advance in the treatment of copper ores. One can form some idea of the magnitude of the copper smelting enterprises in the neighborhood of Butte, when I state that the works of the Anaconda Company alone have a capacity sufficient to smelt 500 tons of ore per day, yielding about 100 tons of copper in the form of matte. And this would have been largely increased had it not been for the disastrous fire which, last March, destroyed some extensive additions.

The Anaconda works, which were first built some four years ago, were molded after the Welsh pattern, with all the old-fashioned methods peculiar to the system which has been so long in vogue in South Wales. It was soon discovered that, with expensive labor and high-priced fuel, some radical change must be made. The works were consequently entirely remodeled in a style which, from their magnitude and the ingenuity shown in handling the materials, may be considered purely American.

Montana may also, I believe, be credited with the only application of the French system for Bessemerizing copper mattes in this country, and from the long period it has been in use, I presume that success has been assured.

Electricity Instead of Sand.—A series of experiments with a new electrical appliance for increasing the tractive power of locomotive engines has just been successfully concluded by Elias E. Ries, of Baltimore, on the Philadelphia & Reading Railroad. The trials were made on the Frackville grade, one of the steepest on the Reading system, and were pronounced eminently satisfactory in every respect. The apparatus consists of a small dynamo and engine mounted upon the locomotive and furnishing an electric current, which is passed forward to the rear driving wheels, through that portion of the track rails lying between them. The passage of the current into the wheels and back causes an increased friction between the wheels and the rails, which is claimed to be far superior to that obtained by sanding the tracks, and enables the locomotive to draw a much heavier train, without regard to the condition of the track, than is at present possible. The Frackville grade averages 185 feet to the mile, and with the dynamo running and a train of forty-five cars attached to the locomotive the ascent was made in twenty-eight minutes, while without the current a trip over the same ground with the same train behind required fifty-five minutes. The current used is what is termed a low tension current, and the increased traction obtained is under complete control by the engineer.

* *Transactions*, xiii., 738.

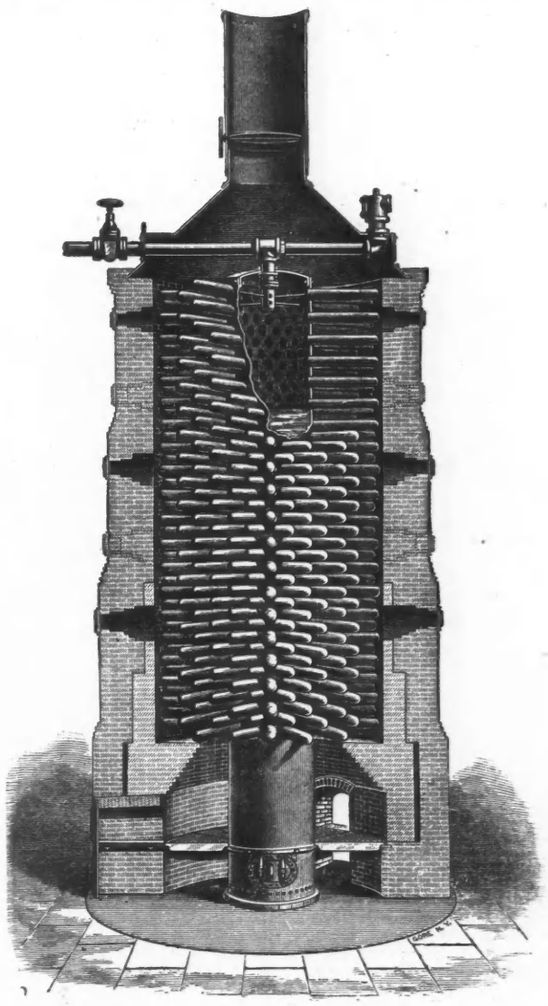
THE HAZLETON BOILER.

The Hazleton boiler, which is by many called "The Porcupine Boiler," is an entirely new departure in that class of steam generators described as water-tube boilers. By referring to the engraving accompanying this article a good idea may be formed of the construction and operation of this boiler.

It is composed essentially of a wrought-iron or steel stand-pipe, from which radiate horizontal tubes, generally of four inches diameter. Each of these horizontal tubes has its outer end closed on itself, thus forming a homogeneous hemispherical end. The inner end of the tube where it enters the stand-pipe is expanded with a roller expander in the same manner as those in the ordinary tubular boiler.

The stand-pipe and tubes are surrounded with a brickwork inclosure, which is surmounted by the hood and necessary stack, the whole forming a substantial structure of neat appearance.

The grate surface is annular in shape, occupying the space between the stand-pipe and the brickwork, near the bottom. By this arrangement a powerful upward draft is obtained, which permits poor grades of fuel to be used with economy, without the aid of a blast or expensive brick chimney. The course of the gases of combustion being at right angles to the tubes, the heat is rapidly absorbed, and it is claimed that the products of combustion pass away at the upper part of the boiler at a temperature but slightly above that of the steam.



THE HAZLETON BOILER.

This boiler is well adapted for use in mining countries, and many have been supplied for mining plants for the reason that it can be transported in small packages, the heaviest part of a 100 horse-power boiler not weighing over 800 pounds, if necessary to have it so small, all other parts being much lighter.

The boiler is an easy one to erect, as with the complete drawings furnished any ordinary good mechanic can put one together without difficulty.

Owing to the manner in which it is constructed, it is not affected by the contraction or expansion of the different parts, every portion being free at one end; therefore it is not liable to get out of order, and if it does, it can usually be repaired in a short time with the same tools required to repair ordinary boilers. It is accessible in every part for examination and cleaning, and every portion of the interior can be examined by entering the manhole at the lower end of the stand-pipe and ascending by using the tube holes for steps. The exterior is easily cleaned with a steam hose through the sight door openings in the brickwork. It can be adapted for burning wood, either in lengths or small pieces.

The steam is dry, and where coal is valuable the fact that the great

volume of dry steam that can be obtained from a very small quantity of coal with this boiler is enough to commend it strongly to practical men.

The makers claim that they have evaporated 11·88 pounds of water per each pound of combustible with a boiler which developed nearly 50 per cent. more than its rated capacity.

Its shipping weight is about half that of other types, and there are no cast-iron parts subjected to the influence of high pressure and intense heat, nor many special parts which have to be procured from the manufacturers in case of accident.

The boilers are certainly durable, as the first one built, one of 275 H. P., has been in use for over nine years, both day and night, and is still in daily use. Steam can be raised from cold water in a few minutes, making the boiler valuable as a generator to furnish steam for fire pumps, or for any other purpose where it is necessary that a high pressure of steam be obtained very quickly.

With the advantages which this boiler possesses and its moderate cost, we see many reasons why it should be adopted by those engaged in mining pursuits generally.

These boilers are made in various sizes to 500 H. P., and interested parties are invited to inspect the boiler in process of construction and at work at the works of the manufacturers, the Hazleton Boiler Company, No. 716 East Thirteenth street, New York, U. S. A., who are the sole proprietors, the Pacific Iron Works, San Francisco, Cal., manufacturing it under contract for the Pacific Coast.

OFFICIAL REPORTS.

THE TAMARACK MINING COMPANY.

The directors in their annual report to the stockholders give the following summary of receipts and expenditures:

"The production of mineral was 14,675,856 pounds, which, at 75·20 per cent., gave 11,036,469 pounds of refined copper, from which has been realized the gross sum of $1,423,332.98; interest receipts, $6,785.59; total, $1,430,118.57.

The costs have been: Running expenses at mine, $508,667.91; smelting, transportation, and all other expenses of handling copper, $180,672.41; total, $689,340.32; showing a mining profit of $740,778.25. Add balance of assets June 30th, 1888, $606,164.12; add amount received from sale of treasury stock, $400,000; add balance receivable from sale of treasury stock, $600,000; total, $1,606,164.12; grand total, $2,346,942.37. Deduct dividends Nos. 2, 3, 4 and 5, $720,000; deduct amount expended in mine plant during the year, $161,178.44; total, $881,178.44; making the balance of assets $1,465,763.93.

"In order to place the mine on a par with the other large producing mines of the world, it was evident that greater development of our property was needed than could be made by means of the shafts in operation. The directors had a full conference with the superintendent, and decided to sink two shafts on Section 11, with a view of more than doubling the present productive capacity of the mine. Consequently in December last they voted to sell the 10,000 shares of treasury stock at $100 per share. It was partly for just such purposes that these shares were created and placed in the company's treasury, and the wisdom of such action has since been more than recognized. This stock, which was offered to the stockholders, in accordance with the vote passed at the time of its creation, was all subscribed for, and $400,000 of such subscription has already been paid.

"The superintendent's report tells what may be expected from developing this portion of the company's land, and the progress that has been made up to the present time. Since his report, shaft No. 2, on Section 14, has reached the Calumet lode at a depth of 2,575 feet, and has found it rich.

"The directors fully share the views of the superintendent, and cannot refrain from congratulating the stockholders on the ownership of so valuable a property, and one which promises to be highly remunerative for many years to come."

The following are the financial statements:

Assets.

Cash on hand at mine	$309.81
Accounts receivable at Boston	2,366.30
250 shares H. & C. R. R. stock	25,000.00
Accounts receivable at mine	33 203.67
Supplies on hand at mine	47,144.27
Hancock & Calumet R. R. Co. 6 per cent bonds	55,000.00
Wood and timber land, about 30,000 acres	153,844.64
Bills receivable	165,701.32
Copper on hand	227,110.32
Cash in bank at Boston	348,343.17
Treasury stock	623,120.00
Total cash assets	$1,681,143.50

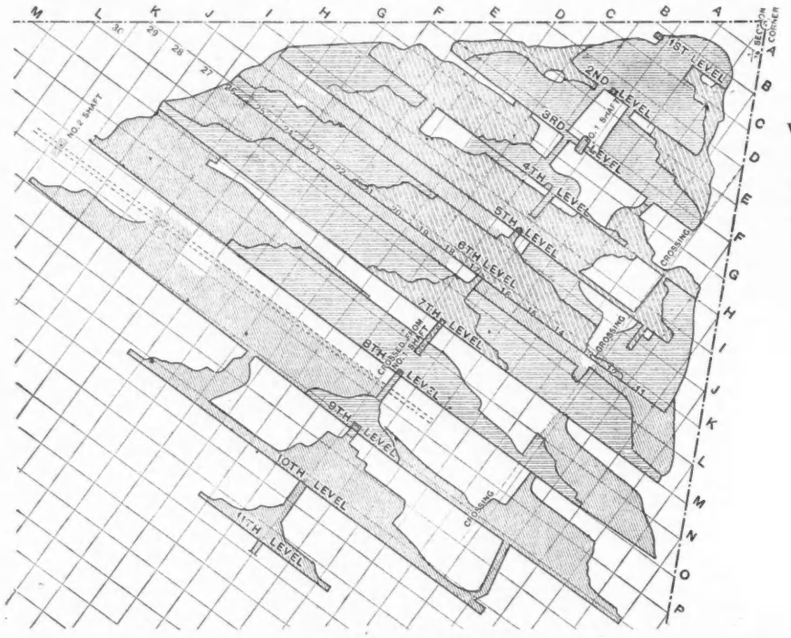
Liabilities.—Unpaid dividends, $348; drafts outstanding, $31,847.54; accounts payable at mine, $66,417.85; accounts payable at Boston, $116,766.18; total liabilities, $215,379.57; balance of assets July 1, 1889, $1,465,763.93.

DETAILS OF MINING EXPENSE.

Underground Expense.

Shaft sinking,	145·80 feet at	$19.39	$2,828.00
Winze sinking,	681·85 " "	11.96	8,156.85
Drifts,	3,433·03 " "	9.55	32,776.00
Stoping,	6,811·46 fathoms at	10.56	71,925.82
Tramming			40,661.50
Timbering, labor, materials and supplies			73,768.74
Extra work			8,151 85
Supplies, labor, fuel, etc., for air drills			34,957.63
Supplies, fuel and labor for engines			56.173.89
Mining superintendence and Co. acct. labor			33,321.53
Blacksmith, machinist and carpenter labor			6,378.61
			$369,100.42
Less profits on supplies, etc.			20,246.50
			$348,853.92

Other Expenses.—Rock-house, $25,580.39; surface labor, supplies, etc., $6,230.61; office labor, supplies, etc., $8,071.83; transportation, $27,863.16; stamping, $80,378.50; incidental expenses, $1,436.66; taxes, less rents collected, $10,252.84; total, $159,813.99; total running expense, $508,667.91.



Work done from July 1, 1885, to July 1, 1886, is shown by fine shading from right to left; from July 1, 1886, to July 1, 1887, by coarse shading from left to right; from July 1, 1887, to July 1, 1888, by coarse shading from right to left, and from July 1, 1888, to July 1, 1889, by fine shading from left to right.

TAMARACK MINE, MICHIGAN.

Construction Costs.—No. 2 engine and shaft equipment, $18,823.84; No. 2 rock and shaft-house, $4,719.60; dwelling houses, $15,180.40; machine shop, $2,345.66; school houses, $1,621.18; blacksmith shop, $940.90; carpenter shop, $299.94; fire engine, $2,930.59; No. 1 engine and shaft equipment, $12,830.86; stamp mills, dwellings, etc., $24,234.41; No. 2 boiler, $84.90; new office, $465.32; new barn, $1,012.05; No. 2 shaft, $54,119.44.

Expenditures on Section 11.—Dwelling houses, $7,651.23; No. 3 shaft, $3,424.20; No. 3 engine and shaft equipment, $8,129.27; No. 4 shaft, $887.54; No. 4 engine and shaft equipment, $603.28; railroad extension, $595.82; change house, $278.01—in all, $21,669.35. Total construction cost, $161,178.44. Total expended at mine, $669,846.35.

SUMMARY.

Rock stamped	169,250 tons	
Product of mineral	14,675,856 lbs.	
Product of refined copper	11,036,469 lbs.	
Yield of refined copper per cubic fathom of ground broken	1,111 lbs.	
Yield of refined copper per ton of stamped rock	65·21 lbs.	
Yield of mineral per cubic fathom of ground broken	1,477 lbs.	
Percentage of mineral in stamp rock	4·34 p. c.	
Percentage of refined copper in stamp rock	3·26 p. c.	
Refined copper, cost per pound at mine		4·61 cents
Cost of smelting, freight, commission, and Boston expense		1·64 cents
Total cost per pound of refined copper laid down in New York and sold		6·25 cents

We take the following from Captain Daniel's report, which is as clear and detailed as usual, and with the accompanying plan fully explains the work done.

"The year's work afforded a moderate increase of copper over that of the previous one. We sent 25,000 tons of rock more to mill, but the increased output of ingot was not proportionate. Returns were unfavorably affected by lean ground which we encountered 10th level north. This

was wholly unexpected, and was continuous for a greater length than anything of the kind previously noted. Conglomerate rock broken afforded 1,111 pounds ingot for each cubic fathom, 117 pounds less than the previous year.

There was no material difference in cost per ton for handling all the rock broken for one year, but as we obtained proportionately less stamp rock the expenditure for it was 14 cents per ton more and up to $3. Our accounts show that the expense for timbering which we do not think will further increase, absorbed a large share of the extra amount spent. With No. 2 shaft in running order we can more than regain the difference.

During the year No. 1 shaft was sunk 145·8 feet, making the depth from surface 2,715·8 feet, and 36 feet below 11th level; the 12th level has since been reached and cross-cutting to the conglomerate commenced. By the close of this year we expect to be regularly hoisting from 12th level. Opening work foots up as follows: No. 1 shaft, sunk 145·8 feet; No. 2 shaft sunk 1,000·4 feet; winzes, conglomerate, 512 feet; winzes, country rock, 169·9 feet; levels, conglomerate, 2,222·1 feet; cross-cuts, 1,210·9 feet; total, 5,261·1 feet.

No opening work was done above 8th level. In back of 6th and 7th levels we removed what remained of very good blocks of ground. Drawing these pillars partly accounts for extra timbering expenses.

The 8th level was drifted north 273 feet, all but the last 50 feet through rich ground. Lode from 15 feet to 17 feet wide. Proximity to No. 2 shaft led us to suspend the drivage. The 8th level south has been advanced 160 feet. Lode here proved fairly good the whole distance. It is at points 13 feet wide, averaging 11 feet. We are still stoping north and south at 8th level in good ground.

The 9th level was drifted north 457·1 feet. On the whole through good ground, the last 200 feet being very rich. This level showed one or two lean patches, the longest about 30 feet, but on the whole has been very satisfactory. The opening is now 100 feet further north than 8th level, the advanced breast being fairly good, and the cutting-out stope, which follows closely, showing quite rich toward the hanging-wall. Ordinarily we find the lode most productive nearest the foot-wall, but at some points, as here, the upper portion of the lode is unusually good and carries most of the copper. The 9th level south has deen extended 427·5 feet. Good stoping ground was encountered when we got beyond the crossing and has continued up to the present. Lode varies from 12 feet in width, near the crossing, to 15 feet further south. Stopes in back of 9th level are among the best we have.

Winze opposite cross-cut, from 9th to 10th level, showed on the whole quite good for copper, giving good reason for expecting the 10th level would open satisfactorily. For 100 feet north of winze we ran in good ground and then unexpectedly encountered the poor piece before referred to. To the end of June last we drifted 324 feet north of winze, and up to date about 100 feet further. The last 50 feet drifted we think has been in regular stoping ground, the opening affording rock of about average quality and improving as we advanced. For a length of 275 feet we ran in lean ground, not without copper usually, but the copper courses, for the most part, narrow. In stoping we find the conglomerate much richer in the bottom of the level than in the back, and this for a good length. We do not think the lean ground extends far below 10th level. To obtain some light on what existed in the back we sunk a winze 175 feet north of cross-cut. For a depth of 54 feet we find the lode below 9th level of good quality; from that point to 10th level the courses of copper are less wide, but there is nothing else special to note. We leave all the poor ground stand that we can in this back, but have necessarily to remove much that is not very desirable to get at what is good above. South, the 10th has been drifted 287·5 feet; up to within a few feet of the crossing, or say for a length of 180 feet from winze, the conglomerate carries about copper enough to pay to handle it, the width being from 9 to 12 feet. At a point 50 feet south of the crossing the lode was found rich, the change being very sudden. Since, and for a length of 125 feet, we have opened ground of extra quality. The lode is nearly 18 feet wide; all but about 3 feet near the hanging-wall is very good. Prospects in this direction are satisfactory.

We are sinking a winze under 10th level, south of the crossing, to ventilate 11th level; this is going down in good ground.

The main winze from 10th to 11th level averaged for copper as good as most we have sunk, but the conglomerate in this line of ground is not regular in productiveness. The 11th level north was extended 109 feet, and later 100 feet further. This opening has been quite an improvement over the level above, and for the whole length has afforded rock of average quality. Lode is about 11 feet wide. The 11th level south extended 118 feet, and since, up to within a few feet of the crossing. For the last 30 feet we have not seen much copper, but look for the crossing after every blast, and beyond it, for rich ground.

The winze from 11th level on the conglomerate is now nearly 100 feet deep. This has not been regular, sometimes lean and again good for copper. As we carry less than half the width of the lode, it is premature to rate it.

No. 2 shaft, sunk 1,000·4 feet for the year, is now down in the conglomerate, and within a few feet of the 9th level, with which in a few days we expect to connect. In July we sunk the shaft 97 feet, which for the force employed and character of rock sunk through I regard as the best sinking attained in this region. The lode in No. 2 shaft is quite rich. Before we can be ready here for regular hoisting, I think we can carry the shaft down to 13th level. The lode opened at that depth will give us a length of ground 2,200 feet, equal to requirements, and will give us opportunity to increase the output and enable us to work cheaper.

We note now with pleasure that the ends of the 10th level are penetrating good ground, both being equal to average, and one the best opening in the mine. So far, also, the 11th level has met our expectations. Here, however, we look for material improvement soon, and if our expectations are met we shall be in a strong position, even independent of No. 2 shaft.

Rock handled for the year was 196,707 tons; 178,859 tons passed through the rock-house; 9,609 tons were discarded, and 169,250 tons sent to the stamps; 17,848 tons were stowed underground, in 4th and 5th levels chiefly. Rock hoisted from conglomerate workings is equal to 9,937 fathoms of ground broken. Mineral produced, 14,675,856 pounds; of this 298,346 pounds were boulders. Ingot obtained, 11,036,469 pounds, the percentage of ingot in mineral being 75·2 per cent. Ingot in stamp rock was equal to 3·26 per cent.

Our mill continues to do good work. Cost of stamping for the year was 47·49 cents per ton. Each head stamped 228 tons per day, of running time, without being crowded to its full capacity. The working of No. 3 stamp on solid bottom was most successful, no part of the machinery breaking. We have recently placed similar bottoms under the other two stamps. Besides dispensing with oak springs under the mortar, we note a reduction in the fuel bill which indicates we have not yet put out best figures.

Construction work goes on steadily. At No. 2 shaft we have built house and foundations for our hoisting plant, 42-inch × 72-inch engines. Machinery for this is now arriving. Shaft and rock-houses, about the same dimensions as at No. 1 shaft, are being erected, boiler-house also. We have brick boiler-house at No. 1 plant, and are finishing a commodious mine office of brick. At stamp mill we are erecting an addition to our building to accommodate two heads of stamps additional. These will be required some time in the future, so we prepare for them slowly. Last year we spent at the mine and mill $20,000 for houses for accomodating employés. For our present force we are fairly well provided.

On Section 11 we have begun the sinking of two shafts, to develop this part of our property. No. 3 shaft is now down 128 feet, and is in good working order. No. 4 is down 54 feet, and but for an excessive flow of water into the shaft, which will soon be taken up, is also all right for sinking. The machinery and equipment here is the same as we have used at Tamarack, Jr., and is good for sinking about 700 feet. When that limit is reached, next summer, we can have a permanent plant ready for deep sinking. It is scarcely necessary to refer to prospects of this part of the mine. If the copper courses of the Calumet conglomerate continue downward, and he would be a bold man who, in light of present developments, would assign the limit, we have here, no doubt, one of the best pieces of copper ground in the world. Deep, no doubt, but the distance from surface, measured by time, will not be more than two minutes, and our experience indicates that increased temperature will not be of importance.

In conclusion, I might note that in the next year No. 1 shaft will, no doubt, be deep enough to penetrate the Osceola amygdaloid. While I do not attach great importance to this, yet I think it possible we may find ground rich enough to work profitably. All poor material can be disposed of advantageously in the worked-out portions of the conglomerate, and, by close selection, and working in connection with the conglomerate, we may have in the amygdaloid a source of revenue.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

A Treatise of Masonry Construction. By Ira O. Baker, C. E. Published by John Wiley & Sons, New York, 1889. Pages, 543. Illustrated. Price, $5.

Submarine Mines and Torpedoes as Applied to Harbor Defense. By John Townsend Bucknill, Honorary Lt.-Col. Reserve of Officers. Southampton, England. Reprinted and revised from *Engineering*. Published by John Wiley & Sons, New York, and *Engineering*, London, 1889. Pages, 255. Illustrated. Price, $4.

The Gold Fields of Victoria. Reports of the Mining Registrars for the quarter ended March 31st, 1889. Compiled and arranged by the Secretary for Mines. Melbourne, Australia. Pages 88. Illustrated and with maps. Price 2 shillings.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED SEPTEMBER 24TH, 1889.

411,414. Electro magnetic Separator. William A. Anthony, Manchester, Conn., Assignor to the Mather Electric Company, same place.
411,417. Process of Refining Iron. John A. Bookwalter, Springfield, Ohio, Assignor to the Bookwalter Steel and Iron Company, Jersey City, N. J.
411,418. Process of Converting Crude Iron into Malleable Iron or Steel. John A. Bookwalter, Springfield, Ohio, Assignor to the Bookwalter Steel and Iron Company, Jersey City, N. J.
411,419. Process of Converting Crude Iron into Malleable Iron or Steel. John A. Bookwalter, Springfield, Ohio, Assignor to the Bookwalter Steel and Iron Company, Jersey City, N. J
411,426. Process of Generating Electricity by Gas Batteries. Olof Dahl, Brooklyn, N. Y
411,427. Conduit for Electrical Wires. Charles C. Dashiel, Washington, D. C.
411,463. Scoop for Clay or Ore Mills. Edward J. Mildren, Black Lick, Pa.
411,466. Car Coupling. Jerome B. Motter, Manni gville, W. Va., and Erastus B. Todd, Pittsburg, Pa., Assignors of one-eighth to Charles L. Schaum, Pittsburg, Pa.
411,480. Apparatus for Swaging and Rolling. Henry H. Warren, Massena, N. Y., Assignor of one-half to Andrew Laundry, Montreal, Canada.
411,496. Electric Railway. George B. Fraley, San Francisco, Cal.
411,500. Roller Bearing. Reuben W. Hent, San Francisco, Cal.
411,539. Underground Conduit for Electric Wires. George A. Wheeler, New York, Assignor of one fourth to Sylvester P. Dennison, Brooklyn, N. Y.
411,542. Rail-joint. Reuben M. Agee and Edward Lane, Canton, Mo.
411,547. Automatic Car-brake. James F. Durkin, Scottdale, Pa.
411,555. Apparatus for Burning Coal and Hydrocarbon Fuel in Combination. Allen Mason, Brooklyn, Assignor to Herbert H. Sanderson, trustee, New York, N. Y.
411,567. Combined Car Coupling and Brake. Julian S. Bashaw, Chipley, Fla.
411,584. Aerial Tramway. Alfred H. De Camp, Boonton, N. J.
411,604. Hoisting-Machine. Edward W. Moore and Henry B. Tefft, Milwaukee, Wis. Method of transforming heat energy into motive power. James J. McTighe, Pittsburg, Pa.
411,609. Ore-Concentrator. Samuel Porter, Denver, Colo
411,614. Crushing-Mill. Alpheus E. Roe, San Francisco, Cal., Assignor to Henry L. Tatum and J. J. Bowen, same place.
411,625. Pump. Albert Thiery, Paris, France.
411,646. Apparatus for Purifying and Refining Oil. Christian Dorn and Emil Noppel, Philadelphia, Pa.
411,652. Furnace-Pipe. Ernst A. Eversman and Daniel Wagner, Toledo, Ohio.
411,660. Implement for Boring Wells. Lewis B. Hart, Plaquemine, La.
411,680. Pumping-Machine. John Richards, San Francisco, Cal.
411,718. Dumping-Car. Frank J. Gibbs, Tyrone, Pa.
411,756. Device for Bending Metal Pipe. Henry M. Brigham, Brooklyn, N. Y.
411,760. Portable Forge. Albert E. Dain, Pittsburg, Pa.

PERSONALS.

Mr. A. Magoon has resigned as general manager of the Rockbridge furnace at Goshen, Va.

Mr. A. S. Burt has been elected superintendent of the Eureka Consolidated Mining Company to fill the vacancy caused by the resignation of Mr. Hank Donnelly.

Mr. Robert P. Porter, Superintendent of Census, has appointed Mr. Richard P. Rothwell, Editor of the ENGINEERING AND MINING JOURNAL, special agent to collect the statistics of the production of gold and silver in the United States and Territories.

The services of a number of mining engineers living in the gold and silver producing States and Territories will be wanted in the collection of the statistics of these metals for the Census report. Application of those qualified for the work should be made to Richard P. Rothwell, Special Agent, 27 Park Place, New York.

The Superintendent of Census has decided to have a special investigation of the subject of the electrical industry for the report of the census of 1890. The inquiry will be intrusted to Mr. A. R. Foote, of Cincinnati.

The second meeting of American Boiler Manufacturers' Association will be held in Pittsburg, Pa., on October 15th. It is expected that all the prominent steam boiler concerns in the country will be represented, and the meeting will be an important one.

The Secretary of the Treasury has accepted the resignation of Dr. James P. Kimball, of Pennsylvania, as Director of the Mint, to take effect October 15th. Mr. Edward O. Leech, computer in the office, is now acting as director, with the understanding that he will be appointed to the directorship as soon as the office becomes vacant, as already mentioned in our last issue.

While Capt. W. R. Jones, superintendent of the Edgar Thomson Steel Works at Braddock, Pa., was examining a furnace on Thursday which had not worked properly during the day, the base broke and six tons of molten liquid metal poured out. Captain Jones and six other men were terribly burned. From the latest accounts, Captain Jones is expected to recover.

The Grand Cross of a Commander of the Legion of Honor has been bestowed upon Mr. Thomas A. Edison M. Spuller, Minister of Foreign Affairs, in conferring the decoration upon Mr. Edison, said that it was given in honor of the services rendered by him to science and for the part taken by him in the Paris Exposition M. Spuller also said that America was splendidly represented at the Exposition, and that the presence of her exhibits testified to the indissoluble bonds which bind France and America together.

At the regular meeting of the Engineers' Club of St. Louis last week, a communication was received from a committee of the American Society of Civil Engineers relative to a revision of the constitution and by laws. A request was made that a joint committee of the two societies be appointed to determine upon a basis of readjustment. The president suggested that three members be selected to confer with the New York society, and a resolution to that effect was carried, with an amendment that the following plan, as outlined by the executive committee, be followed: "All local organizations to become chapters of the American Society of Civil Engineers, and to have the exclusive right of electing to grade similar to the present grade of associates. Such members of the local organizations as are not now members of the American Society of Civil Engineers to become associates by their clubs entering this union." Messrs. Robert Moore, R. E McMath and G. A Seddon were appointed a special committee to consider the matter, and send an accredited representative to the proposed conference in New York.

By the will of the late President F. A. P. Barnard, of Columbia College, New York, the college receives the whole estate after the death of Mrs. Barnard. It is provided that out of the estate, after it comes to the college, $10,000 shall be taken for the foundation of a Fellowship to be known as the Barnard Fellowship for Encouraging Scientific Research. The income of this amount is to be devoted to the support of some Alumnus of the School of Mines or Arts who may be recommended to the trustees by joint vote of the Faculties. The remainder of the estate is to be taken to form a fund to be known as the Barnard Fund for the Increase of the Library. Out of the income such books as may be most needed are to be bought by the librarian. The books are to pertain to physical or astronomical science. It is also provided that the trustees shall have a medal struck off, not to cost less than $200, to be known as the Barnard Medal for Meritorious Service to Science. A copy of this medal is to be presented at the end of every five years to the person who shall have during that period made such discovery in physical or astronomical science, or such novel application of science to purposes beneficial to the human race as shall in the judgment of the National Academy of Sciences of the United States be deemed the most worthy of such honor. The medal is to bear the inscription, on the obverse side, "Magna est veritas," and on the reverse, "Deo optimo maximo, gloria in excelsis."

OBITUARY.

Mortimer Lent Earle, who up to a couple of years ago was an extensive dealer in mining stocks on Wall street, died on the 26th inst. at his home in New York City. He had retired from active business pursuits since being thrown from his carriage, over a year ago, in Central Park. He was a member of the Consolidated Stock Exchange.

Nelson Marvin Beckwith, a well-known citizen of New York, died on the 17th inst., in this city, age 83. At the Paris Exposition of 1867 Mr. Beckwith was appointed Commissioner-General to represent the United States. In 1876 he represented New York State at the Philadelphia Exhibition, and was the originator of the American system of awards.

Edward Fenwick Boyd, a past-president of the North of England Institute of Mining and Mechanical Engineers, died at Moor House, Durham, England, on August 31st, having just entered upon his 80th year. Mr. Boyd had been for the last 50 years mineral agent for the Dean and chapter of Durham and their successors, the Ecclesiastical Commissioners for England. Mr. Boyd had a large share in the foundation, in 1851, of the North of England Institute of Mining and Mechanical Engineers, and served successively the offices of treasurer (1852-1870) and of president (1870-1875) of that body.

INDUSTRIAL NOTES.

The Landore Steel Works, at Swansea, Wales, have been destroyed by fire. The loss is heavy.

A company has been organized at Ashland, Ky., with Captain Otho Adams at the head, for the manufacture of mineral paint.

The Laflin & Rand powder mill at Cressona, three miles below Pottsville, Pa., blew up on the 26th inst. Three men were killed and a number of other workmen injured.

The Rockbridge furnace, at Goshen, Va., is out of blast, making needed repairs. They will put in additional boilers of a more modern type. Mr. John Hartman has the contract to place his patent bosh-coolers around the furnaces.

The Henderson Steel Company, of Birmingham, Ala., has decided to issue $50,000 of bonds. The company, it is said, has capital in hand for the erection of the plant it is putting up at North Birmingham, and the bonds are for the purpose of working capital.

The long strike at the Columbia Rolling Mills, Lancaster, Pa., was formally declared off by the Amalgamated Association on the 21st inst. The strike lasted nearly seven months. Most of the strikers' places have been filled with non union men, who will be retained.

The nail factories of Ironton, O., and Ashland, Ky., have under consideration the erection of a steel plant at the latter place of 300 tons capacity per day. A grant of ten acres has been offered for a site. Three mills, with a total of over 300 nail machines, are located at the two places.

The Plymouth Rolling Mill property in Conshohocken, Pa., was sold at sheriff's sale for $20,000 on the 25th inst. to Charles Hunsicker, attorney for Isaac Fegely and Jacob Fegely, of Pottstown. The place was sold on an execution on two mortgages aggregating $15,151 05. The Messrs. Fegely also have a claim of about $72,000 against the property, which makes its actual cost to them about $87,000. The plant includes a fully equipped rolling mill, brick office building and eight dwelling houses. A portion of the works was erected about four years ago, and the whole plant cost, it is said, about $150,000. The affairs of the Plymouth Rolling Mill Company are still in the hands of an assignee.

Among other improvements recently made by the Walker Manufacturing Company, Cleveland, Ohio, one of great importance has been the building of a very large pit lathe capable of turning work up to 30 feet diameter by 8 feet 6 inch face. This lathe is a combination tool, it being not only a pit lathe, but also a huge planer in which surfaces 30 feet long by 8 feet 6 inches wide can be planed. It also has facing attachments for the proper facing up of the ends of columns and girders. In addition there are gear planer attachments whereby the teeth can be placed in gears of any size up to 30 feet diameter, and of any proportions desired. This tool places the Walker Manufacturing Company in the best possible shape for the production of this heavy class of work.

The Pelton Water Wheel Company, of San Francisco, Cal., we are officially advised, has furnished the Treadwell Mill, of Alaska, a power equipment presenting many very interesting features. The mill referred to is the largest mill in the world, consisting of 240 stamps, 96 concentrators, 12 ore crushers, etc., etc., requiring about 500 horse power.

All of this machinery is now run by a single Pelton wheel. The wheel is seven feet in diameter and runs under a head of 490 feet, making 235 revolutions, using 630 cubic feet of water per minute, which is discharged through a nozzle 3.31 inches diameter. With a four-inch nozzle the wheel will work up to 735 horse power. Perfect regulation is afforded by the use of a deflecting nozzle operated by a hydraulic governor. This is a ball joint nozzle some four feet in length, to the discharge end of which is attached the regulating device, throwing a small portion of the water on or off the buckets as may be needed to adapt it to varying loads. This device has been generally adopted by the Pelton Company as affording the most simple, sensitive and satisfactory regulation.

Comparisons are often made at the East between the advantages of steam and water power. As applied on the Pacific coast, water has so much the better of steam that the latter is not to be thought of where water is available. A striking instance of this advantage is here afforded. The wheel above referred to weighs but 800 pounds, and the entire equipment, embracing shafts, boxes, driving pulley, etc., weighs only about 4,000 pounds. A steam machinery plant to give the maximum capacity of this wheel would not weigh less than 200 tons. The cost of driving a steam plant of such capacity would run well into the thousands every month, while in the matter of maintenance the cost of the Pelton wheel is merely the oil needed for the journal bearings.

In addition to the above equipment, an 8-foot Pelton wheel to drive a 15-drill compressor, requiring 175 H. P., has been supplied; also two small 18-inch wheels to run two 125-light dynamos, which light the entire works.

Probably no such amount of power was ever before furnished at so low cost, and is a fair illustration of the modern methods of mining, and of how low-grade mines can be made to pay large dividends.

CONTRACTING NOTES.

Manufacturers of machinery, engineers and contractors should consult our directory of "Contracts Open," on page xx. This week proposals are invited for the following work: American Hydraulic Cement; Steam Heating; Sewers; Artesian Well; Dredging; Asphalt Paving; Electric and Gas Lighting; Bridge Construction; Water Works Construction; Water Supply and Sewerage; Steam Heating and Plumbing; Steam Heating.

The Ordnance Bureau of the War Department has opened bids for supplying 8,000 pounds of tinned steel wire, of rectangular or square section, and 21,000 pounds of steel wire of square section, for wrapping guns. The wire for which the bids were invited is intended for use in making the Woodbridge ten-inch rifled gun. It is said at the Department that one, at least, of the bids was reasonable enough in price to warrant a purchase if the wire is of good quality. To determine this point the Department will immediately test the samples submitted. When the material is procured the Ordnance Bureau will again advertise for proposals for building the gun, the material and machinery for winding the tube with wire to be supplied by the government.

Secretary Tracy has issued a circular modifying the advertisements issued from the Navy Department in August, inviting proposals for the construction of three vessels for the Navy, of 2,000 tons displacement each. The modification is such as to permit bidders who may desire to offer to construct more than one of the vessels to embrace in one proposal either two or all three of the vessels. This change is made to enable bidders to make composite offers by which means they may be enabled to give lower figures on each of two or three ships than on one alone. Under the first advertisement, which brought no acceptable bids, this was possible, but in readvertising, as noted in the ENGINEERING AND MINING JOURNAL of August 31st, the form was so worded as to force bidders to give separate bids for each ship, thus running the risk of having all but one of their bids rejected, while they really could build all of the cruisers at once.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

194. Bids on 20 arc and 250 incandescent electric light plant, with steam plant, excluding poles. Tennessee.

195. Addresses of makers of dredge suitable for excavating ditches from 4 to 20 feet wide on bottom. Illinois.

196. Addresses of makers of highway bridges. Western firms preferred. Illinois.

197. Stand pipe, complete, to furnish water for town of 3,000 inhabitants. The creek from which

the water will be taken is 400 yards from where the pipe will stand, and main pipe from stand pipe will be one-half mile long. South Carolina.

194. Wood-working machinery—rotary planer, hub boring and mortising machinery. Shaping and sand papering machines. Virginia.

199. Boring machine to bore pump tubing. Virginia.

200. Completed outfit, engine and boiler excepted, for washing 25 or 50 tons of clay per day. Mississippi.

207. Wood-working machinery for manufacturing furniture. Texas.

208. Bids for a cold storage plant, room 30 × 40. West Virginia.

209. Electric street railroad—plant of about two miles, using T iron of 20 to 30 pound weight, and 50 horse-power and boiler. Virginia.

210. Pulverizer for free milling ore. Colorado.

223. Iron jack screws. New York.

224. Addresses of manufacturers of iron piers, especially those having supplies on hand ready for such work. Rhode Island.

225. Lathe for turning rolls; large enough for 10 and 16-inch rolls with 22-inch swing. Also rotary squeezer large enough to take a 200-lb. ball. Georgia.

226. Addresses of makers of wire nails. Indiana.

227. Wood working machinery. South Carolina.

228. Wood working machinery; band saw, door and sash clamp, and blind machinery. South Carolina.

229. Artesian well sinking machinery. New Jersey.

230. Corrugated iron roofing. New Jersey.

231. Lumber. New Jersey.

232. Twenty H. P. boiler and 15 H. P. engine. North Carolina.

236. Ice machine, 15 tons capacity. Alabama.

237. Ice machine, 5 tons daily capacity. South Carolina.

238. Noiseless street motor immediately, to haul standard cars with 30 tons freight around short street curves. South Carolina.

239. Second-hand machinery for hoisting and pile driving. Also portable double drum and engine and boiler complete. Rhode Island.

240. System of warm water heating for offices and stores. Virginia.

241. Second-hand Norwalk air compressor, 1888 pattern, capacity 4 to 6 three-inch drills. Must be in good working order and age of compressor must be stated. Michigan.

242. Suspension drill press and pulley. Also table for boring out fly and other wheels. Maryland.

243. Second-hand light rails, 24 or 36 pounds. New York.

244. Estimates on cost of building complete coke plant of 100 ovens, with washing and crushing machinery. Ohio.

245. One power pipe-cutting and threading machine, range from 2½ to 8 inches, inclusive. Mississippi.

246. Names and addresses of lapidaries or jewelers who make or handle diamond dies for the purpose of drawing wire. Ohio.

AMERICAN GOODS WANTED ABROAD.

201. Pony carriage, four-wheeled, to carry four adapted in size for ponies from Shetlands to 14½ hands high. Queensland, Australia.

202. Prices on ore sacks per thousand. Mexico.

203. One 60 to 80 H. P. horizontal engine, plain side valves. Cuba.

204. Fifty sugar wagons. Cuba.

205. Four centrifugal machines, Western, new or second hand, in good condition. Cash or on delivery. For shipment to sugar plantation in Cuba. New York.

206. Flour mill machinery; small plant. Mexico.

211. Carriage and buggy furnishings, shafts and whips. Philippine Islands.

214. Platform scales. Philippine Islands.

213. Windmills and pumping machinery for irrigation work. Philippine Islands.

214. Stone channeling and quarrying machine. Philippine Islands.

215. Cheap watches. Philippine Islands.

216. Varnish and spirits of turpentine. Philippine Islands.

217. Kerosene oil, 135 degrees and 150 degrees flash. Queensland, Australia.

218. Dried apples in quarters and other fruit in tins. Queensland, Australia.

219. Cream tartar. Queensland, Australia.

220. Clothes-pins. Queensland, Australia.

221. Tobacco. Queensland, Australia.

222. Canned goods. Soup and oysters. Queensland, Australia.

233. Pump, to pump 50,000 gallons per day (10 working hours) a distance of four miles, with an elevation of 500 feet, engine and pipe; state price f.o.b. New York, also freight by car lot, to Guaymos and to Hermosillo, Mexico.

234. Mine pump. Mexico.

235. Catalogues, mining machinery, pans and settlers, shoes and dies. Mexico.

247. Catalogues of brick-making machines. Mexico.

GENERAL MINING NEWS.

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—It is estimated that the net earnings of this company for August were $57,000; fixed charges, $35,000; surplus, $22,000.

Shipments of iron ore from the mines of the district mentioned below for the season up to and including September 18th, as reported by the Marquette, Mich., *Mining Journal*, were as follows:

	Tons. 1889.	Tons. 1888.
Marquette, Marquette District....	1,073,892	569,716
St. Ignace, " "	36,447	85,487
Escanaba, " "	713,881	591,575
*Gladstone, " "	14,950	.....
" " Menominee District....	31,957	.....
Escanaba, " "	1,194,595	750,341
" Gogebic District.....	263,223	128,647
Ashland, " "	1,175,773	781,771
Two Harbors, Vermillion District.	658,453	253,965
Total, tons.....	5,103,171	3,161,502

*The shipments from Gladstone, Marquette District, are shipments from the Republic mine, and from Gladstone, Menominee District, shipments from the Chapin and Ludington mines.

CALIFORNIA.

According to reports there has recently been a revival in quicksilver mining operations in the Cinnabar mining district in Lake and Sonoma counties, and the prospects are favorable for a largely increased production in that locality. A new recorder for the mining district has been chosen, and several hundred miners and prospectors are ranging over the mountains.

BUTTE COUNTY.

BIG BEND TUNNEL AND MINING COMPANY.—It is reported that this company, which was organized in 1881, with a capital stock of $20,000,000, shares $100 each, by Dr. R. V. Pierce, of Buffalo, has failed. Buffalo parties are largely interested in the enterprise, of which Dr. Pierce is President and Dr. Lee H. Smith Treasurer. The former, it is stated, owns from 60 to 70 per cent. of the stock. The Feather River, in Butte County, is said to be rich in its deposits of gold, and the north fork of the river, called Big Bend, was considered particularly rich in gold deposits in its gravelly bed. When Dr. Pierce organized this company the scheme was to divert the stream from its natural bed through a huge tunnel, thus exposing the deposits supposed to be lying along the bottom of the river. In an official bulletin announcing the failure of the scheme Dr. Pierce says: "But after all our efforts, and much as we regret to acknowledge the fact, yet we are quite prepared to admit that at present we see no prospect of realizing our former expectation with respect to these mines."

The only prominent Californian who took any stock in the concern was Major Frank McLaughlin, of Butte County, who induced Pierce and others to invest. McLaughlin had worked over the Big Bend at placer mining and claimed that millions of gold lay on the bed of the stream, which the placer miners could not reach because of the swift current. Work was begun on the tunnel, which was illustrated in the ENGINEERING AND MINING JOURNAL of March 12th, 1888, in 1882, and by April 12th, 1886, it was completed for 12,000 feet. The tunnel was nine by sixteen feet, with a 30-foot grade. When the water was turned in it was found that the tunnel was too small, and it was enlarged to twelve by sixteen feet. Much of the work was through hard rock, and enormous quantities of dynamite were used. The cutting of this tunnel cost, it is said, not less than a million and a half, but the large dams and other work cost another half million. When the river bed was finally drained it was found that the best gold-bearing sand was under huge boulders, the removal of which was very expensive.

MONTEREY COUNTY.

MARIA ROMAN.—It is reported that the long lost mine known by early settlers as the Maria Roman Mine has been found. The mine, if accounts are correct, is located near the head of the Carmel River, about fifteen miles from Monterey, and was found by Mr. Foreman while deer hunting. He also found the old furnace and instruments used for crushing ore.

COLORADO.

BOULDER COUNTY.

LIVINGSTONE.—Dr. Everts, Captain Coan and others have taken up a lease and bond on this mine. It is located on the southeastern slope of Sugar Loaf mountain and yields a low grade of ore, which is dug out by the shovelful and hauled by wagonload to Argo. According to reports, the lessees after paying all expenses have cleared from $7,000 to $10,000 per month. There are about a dozen men employed on the mine at present. The mine was once offered in London, but the sale fell through; it is now owned by local investors.

UTICA.—A shaft in this mine, at Ward, has been sunk to a depth of 286 feet below surface. At the bottom of the shaft, levels have been run east and west on the course of the vein through bodies of ore. The lode, says the Denver *Republican*, is 8 feet thick between walls, and has produced large quantities of smelting ore that averaged from $70 to $100 per ton, while the stamp mill ore will run not less than $10 per ton. The level on the east of the main shaft has been run 140 feet through good ore, and it seems to grow better as the ground is opened out and length is gained. The level on the west of the shaft has not been driven so far. It is only about an 88-foot shaft. On an average 100 tons of smelting ore are shipped to Denver per month, besides a large amount that goes to the mill. Dr. R. H. Kline, of Philadelphia, Pa., is reported to be a large stockholder in this property.

GUNNISON COUNTY.

BETA.—Last month the output of this mine was about 135 tons, while its average shipments now are about six tons daily. The strike in the bottom of the main incline at a depth of 165 feet is developing well. The chute is over two feet wide and is widening as depth is gained. As the contract work has been finished, says the White Pine *Cone*, Superintendent Carman has commenced hoisting ore from this new discovery, and it is of a higher grade than any hitherto taken from the mine.

SYLVANITE MINING COMPANY.—Only two or three men are employed at present. According to a local paper, Superintendent Murphy says it will be decided shortly whether it will be worked or not, and that Mr. Baker, on whom it depends to raise the money to do the work, writes encouragingly from Boston.

LAKE COUNTY.

CHADBOURNE.—Sinking the shaft on this property has been resumed, and it is going down at the rate of 4 feet per day, a sett being placed in position every 24 hours. The new and powerful double boister, as well as the other machinery, is now in running order. The shaft is making considerable water, which is lifted to the 400-foot level and sent over to the old shaft by a new Worthington pump, and from thence raised to the surface. The shaft has now attained a depth of 535 feet, and, with the connection made with the original shaft, the workings are thoroughly ventilated. Shipments remain about the same, all ores being hoisted through the old shaft, and the grade of the ore is unchanged.

COLUMBIA.—The contact has been reached at a depth of 650 feet without encountering much water.

DUNKIN MINING COMPANY.—Messrs. Hughes Brothers are working on the second level of No. 1 shaft, under lease from the company, and are taking out and shipping some very fair ore. The argentiferous iron is being worked at a greater profit, owing to the fact that it is easily got at and mined, and in large bodies.

R. A. M.—In the south drift of this mine it is stated that another body of ore has been encountered, shipments from which will be considerably delayed on account of the air being so bad in that portion of the mine that but two or three men can work there at present. Connections are to be made soon with other workings, which will obviate this difficulty. The chute first struck continues to open out and improve in every way.

ROBERT E. LEE MINING COMPANY.—Work has been resumed on No. 6 shaft, the cage shaft, and Mr. Holden is breaking iron preparatory to shipping on a large contract which he has made with one of the Leadville smelters. This shaft has not been worked for some little time, and it is in this iron ore body that some of the richest chloride ore has been found.

SMALL HOPES CONSOLIDATED MINING COMPANY.—Work here is going on as usual. Most of the ore is hoisted from the Keren and Casey shafts while the drifting from the 500-foot level of the McCormack shaft is still being driven ahead. At this point a large body of iron sulphides was encountered, which is opening out and the grade steadily improving. At the old Elkins shaft the company has a number of men at work sorting over the dump, from which point, it is said, excellent ore is being recovered, and quite a considerable amount of profit accruing to the company.

PITKIN COUNTY.

CAMP BIRD.—The strike in the south end of this mine is attracting considerable attention. It is reported to show from six to eight feet of mineral running from 75 to 100 ounces. The discovery in the north end of the claim is also said to be good. A winze in the ore body was sunk 9 feet.

HANNIBAL.—This mine is situated on the west face of Aspen Mountain, at the head of Ophir Gulch. It is developed by a shaft 340 feet deep and an incline of 25 feet. The bottom of the shaft shows four feet of ore that will run, according to Aspen papers, high in silver. The mine is leased to W. D. Ragland, Lee Pellen, Julius Wist, James West, Charles Russell & Co., and is owned by Mr. Bush, of Aspen, and others. Work was commenced by the lessees last March.

J. C. JOHNSON.—Two important strikes are reported. This mine, it is said, has been a regular dividend payer for several years, and has large reserves of ore. The second level, in driving through the second ore chute, has encountered a body of ore 1,000 feet north of the incline. The ore is said to be five feet thick. The third level has disclosed a body of ore of similar thickness and of a little higher grade, 80 feet north of the incline.

LAST DOLLAR.—Considerable development work has been done on this mine. The main shaft is about 300 feet deep. The ore is found nearly 300 feet deeper, and almost directly under the shaft, but it has to be moved about 1,200 feet to get it to the surface. It is leased to parties who are nearly all also interested in the property. Those who are not interested in the property were not willing to have the shaft sunk where the mineral was discovered. The lease will now shortly expire, and it is supposed that the majority have simply determined not to attempt to push production until they can reorganize and sink the shaft so that the ore can be hoisted economically.

TOURTELOTTE MINING COMPANY.—Mr. John T. Milliken, Vice-President of this company, at the request of President Helm, has notified Messrs. Mullally, Amann and Grawe, members of the committee representing the stockholders, that President Helm has advanced the company $4,256.59; that the expenses of the mine for September will amount to about $1,500, which sum must be raised by the stockholders on or before the first proximo, or the work of developing the Bay State claim will cease and the lease and bond revert to the owners of the mine. It is stated that suit has already been brought both in St. Louis and Aspen by one of the stockholders against the company.

SAN JUAN COUNTY.

ARIADNE.—The crosscut, which has been running in this mine on Cement Creek all summer, is reported to have reached the pay streak. The ore is yellow copper, gray copper and sulphuret. Assays from samples are said to return as follows: Soft ore $76.50 gold, and $69 in silver. Hard ore $87.50 gold and $43 in silver per ton. No assays have yet been made for copper, which will probably be from 12 to 15 per cent. The mine is now being straightened up preparatory to taking out the ore. Probably two weeks will elapse before any considerable shipments are made. The mine will be worked all winter. The property is owned by Alfred Iles, the editor of the *Miner*.

POLAR STAR.—This mine, on Engineer Mountain, is making large shipments of ore, which is reported to yield from 240 to 500 ounces silver per ton. It is a pockety grayish quartz containing a black sulphuret. It is probably the only mine in the country that is shipping that character of ore.

SAN MIGUEL COUNTY.

SAN MIGUEL GOLD PLACERS COMPANY.—Mr. U. C. Wynkoop recently visited the property of this company, and was present at the clean-up, according to the Denver *Republican*. He states that it was not satisfactory, but for this declares that it is no fault of the gravel, as that washed from the channel averaged fully $1 per yard. However, three-fourths of the stuff handled came from the overflow of rock, which is entirely barren. The remainder of the bars are clean, as nothing but channel gravel of equally good grade as that of the first bar is to be found. It is said that the company has had a small army of idle men on its payroll during the summer.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA MINING COMPANY.—Acting Superintendent Wilson reports to the New York office as follows: "Winze from the 300-foot level is down 44½ feet. The upraise from the 400-foot to meet it has advanced 27 feet from sill floor. Each is progressing satisfactorily. The general appearance of the mine is good." The gross product for August is stated to be $24,600.

IDAHO.

BOISE COUNTY.

ELKHORN.—The report comes from this mine, near Idaho City, that the cross-cut from the lowest tunnel has pierced a well-defined lode of rich ore. The vein at present, it is said, shows a width of four feet, and that it is the original Elkhorn lode. In seeking for this old lode by the lower tunnel several smaller veins were pierced, the working of the one from which retarded the progress of the main tunnel.

CUSTER COUNTY.

DICKENS-CUSTER MINES, LIMITED.—The Idaho papers state that from present indications it seems to to be assured that this company will resume active operations. The mill and mines have been idle for some months, but a force of miners has been put to work on the Lucky Boy, and all other arrangements for the full and usual working of the mill and mines have been made. The first general meeting of the company was held in London on the 9th inst., at which Mr. McDermott presented his report on the property generally, and on the Lucky Boy and Anna group of mines, which the company has recently purchased. Mr. Robert Robinson has been appointed superintendent.

FOURTH OF JULY.—The owners of this mine are putting up a ten-stamp silver mill to work its ores. The mine lies some six or seven thousand feet east of the Lucky Boy. It is a well-defined ledge, but has not been developed to any great extent. The mill is to be ready for operations within two months.

ILLINOIS.

W. L. Scott, the owner of the Spring Valley Mines, has sent for the Arbitration Committee of the Coal Miners' Association at Spring Valley to meet him in Chicago on the 27th inst., with a view to a settlement of the present difficulties. He has receded from his determination expressed in his last proposition not to treat with any committee or organization, and everything now points to a speedy settlement of the mining difficulties in this district.

INDIANA.

The striking miners at Brazil on the 25th inst. rejected for the third time the block-coal operators' demand for a 15c. reduction. They still demand arbitration. Every mine in the discrict has been ordered closed where the operators refuse to sign a year's contract at last year's scale.

MICHIGAN.

Mr. Schlesinger, in the interest of a German syndicate, as already mentioned last week, has secured options for the purchase of the Winthrop and Mitchell mines of Ishpeming for $300,000; the Buffalo, South Buffalo, and Queen mines, at Negaunee, for $75,000, and has options on the Riverside mine, at Republic.

COPPER MINES.

TAMARACK MINING.—The addition to the mill of this company, designed to hold No. 4 stamp head, is being inclosed, and the solid foundations for the head are being put in. The solid foundations have been in use under the Nos. 1 and 2 heads for some time, and, it is said, are proving to be as efficient as the one which has been in use under No. 3 head for over a year.

GOLD MINES.

ROPES GOLD AND SILVER MINING COMPANY.—Twenty new stamps have been added to this mill, making 65 in all. They are running 24 hours a day seven days in a week. The capacity of the mill is now trebled.

IRON MINES.

BESSEMER IRON COMPANY.—A press dispatch of the 22d inst. has the following: For a long time there has been a bitter fight between the shareholders and the bondholders of this company. The parties and corporations representing the bondholders were the Commercial National Bank of New York, the People's Bank of Charlotteville, Va.; the American Loan and Trust Company, of New York, and Robert G. Ingersoll, George P. Sheldon, S. B. Dorsey and others. Theobald Otjen, Receiver of the bondholders, has been displaced by Alfred A. Krause, representing the interests of the shareholders. For several months a contest between the two interests has been going on before Judge Sloan, of Waukesha County. The bondholders have just withdrawn all suits pending in the above county, leaving the field to the shareholders, or rather to Adolph Docter, representing them. The latter will now move to restore the mines to the shareholders, and also proposes to make it warm for the former officers and directors of the company. E W. Oglebay, of Cleveland, O., was formerly President, and J. J. Gill, of Steubenville was Secretary. The attorneys for the shareholders allege that the parties interested in the mines, who were ex-Senator Stephen W. Dorsey, Robert G. Ingersoll, the Hon. William Windom, Jesse R. Grant, and other persons of national reputation, have conspired to wreck the mine, appropriating the books of the company, making no account of ore sold, and have issued fraudulent notes and bonds. It is further alleged that last June a majority of the directors resigned and elected new officers, who, it is claimed, were simply clerks in the office. Prior to announcing these facts to the shareholders, the attorneys allege, there had been issued first mortgage bonds which were distributed to parties in New York, Cleveland and other cities. The old management, claiming that the rent of the mines had not been paid, then abandoned them, and, with all properties, turned them over to the owners of the land. This, it is alleged, was simply a collusion between the fee owners and the retiring officers, for the purpose of freezing out the shareholders and obtaining entire ownership of the mines. The mines are heavily mortgaged, and the affairs of the company are so badly mixed up that Mr. Otjen says he saw no way out of the difficulty and so resigned his receivership. The attorneys for the shareholders claim that he was forced out, and will now make a desperate fight against all attachment suits and endeavor to resume possession of the mines. This they propose to do by means of civil and criminal suits against the above gentlemen.

MONTANA.

DEER LODGE COUNTY.

HATTIE.—Work on this mine, near New Chicago, which shut down recently, owing to a misunderstanding among the stockholders, has been resumed, sufficient stock having been placed in St. Paul, it is said, to make a good working capital.

HOPE MINING COMPANY.—The mill of this company, at Phillipsburg, which has been idle for the past three months, started up again on the 15th inst. Ten stamps are dropping on some rich ore, which, it is said, was struck recently in the company's mine.

PHŒNIX MINING COMPANY.—This company, in the vicinity of the Champion and Mountain Lion properties, has been incorporated with a capital of $1,000,000. Two-thirds of the stock goes into the treasury as working capital. The officers are E. Miller, president; A. Cain, secretary, and E. Hansen, treasurer.

RED LION.—It is reported that the additional five stamps put in recently in this company's mill are now dropping, and 15 tons of ore are being crushed every twenty-four hours. In the mine development work continues. Work is now carried on in the drift from shaft No. 3, and an upraise is being made to connect the drift with the air shaft further up the hill. The drift is in 100 feet and about 75 feet underground.

NEVADA.

DOUGLAS COUNTY.

RED CLOUD.—Ore is being extracted from this mine in Red Cañon district, which it is expected will run high in gold. The district is noted for "pockets" of gold-bearing quartz.

ESMERALDA COUNTY.

ESMERALDA, LIMITED, MINING COMPANY.—This company, at Aurora, is about to drain the Real Del Monte mine to the 500 level. Steam pumps are expected shortly for the Humboldt Electric Company. Soon thereafter, it is stated, they will construct a plant for the transmission of electricity generated by dynamos at Walker River, to operate an extensive stamp mill.

LYON COUNTY.

HAYWOOD.—The working force of miners has been increased. In sinking on the hanging wall of the ledge below the winze level recently rich ore was encountered which is now being extracted. During the month of August there were extracted and crushed at the mill 460 tons of ore, which yielded a gold bar worth $7,000. This left a margin above operating expenses. The mine is located at Silver City.

STOREY COUNTY—COMSTOCK LODE.

The ore yield of Comstock mines for the week ending September 14th aggregated 3,903 tons, divided as follows: Con. Cal. & Va., 2,695 tons, assay value $28.20 per ton; Occidental, 350 tons, assay value, $17.10; Justice, 238 tons, assay value, $23.58; Alta, 220 tons; Yellow Jacket, 400 tons. The bullion yield of the above was about $95,000.

There has been entered in the United States Court, in Storey County, a suit in behalf of the Union Mill and Mining Company against nearly 100 defendants, principally ranchers along the Carson River, to adjudicate the water rights on that stream. Printed notices were sent to all the defendants, and those who fail to answer are notified that the penalty inflicted by the court will be $250.

As stated in the ENGINEERING AND MINING JOURNAL a few weeks ago, similar action may be taken by the Comstock Tunnel Company, the successors of the Sutro Tunnel Company.

At the Ward combination shaft, which is now operated by the Potosi, Bullion, Exchequer, Alpha and Julia Consolidated companies, the shaft has been repaired down to the 1,850-foot (water) level. A station is being opened on the 1,050-foot level, preparatory to exploring the ground.

The San Francisco *Daily Report* publishes the following statement, the importance of which, if true, will be at once realized by readers of the ENGINEERING AND MINING JOURNAL: Deep mining in the Comstock lode will soon be resumed, not in one mine but in a whole series of mines, and perhaps eventually in every mine upon the lode. Operations are first to begin in the Gold Hill group of mines. In an interview with W. E. Sharon, superintendent of the Yellow Jacket, Challenge Consolidated, Confidence and Consolidated Imperial mines, that gentleman gave the following particulars: The 1,400-foot level of the Crown Point mine has been selected as the starting place for draining the Gold Hill section of the Comstock lode. On that level there is a drain drift 2,200 feet long leading from the main incline to the south lateral branch of the Sutro tunnel, with which it connects at a point 50 feet north of the Yellow Jacket new shaft. This drain drift was started about two years ago, and the expense of running it was shared by the Crown Point, Belcher, Yellow Jacket, Confidence and Challenge Consolidated mining companies. It was run from both sides, and was connected during last winter, and was intended for the very work which is now being laid out for it. It is proposed to put in some powerful plunger pumps to be run by compressed air on the 1,400-foot level at the point of connection between the drain drift and the Crown point incline. This incline extends down to the 3,000-foot level. The water which now floods these mines stands at about the 1,600-foot level. The plan is to raise the water to the 1,400-foot level and allow it to escape through the drain drift and thence into the south lateral branch of the Sutro tunnel, into and out of the main tunnel. The water is to be lowered to the 2,700-foot level, at which point explorations will first begin in the mines. It is a well-known fact that on the 2,700-foot level of the Belcher a vein of good ore was struck about seven years ago under the superintendency of Hank Smith. Shortly afterward, and before much exploration could be done upon the new find, a vast body of water was struck on the 1,900-foot level of the Exchequer mine, which inundated the lower level of the Belcher, Crown Point and all the other mines at Gold Hill, and led to a cessation of deep mining in that part of the lode. Prior to this deep mining had been suspended in the north end mines, and it was subsequently suspended in the middle mines, for those mines had to take much of the water which filled the lower levels of the Gold Hill mines. Superintendent Sharon says that he believes that the resumption of work in the ore vein on the 2,700-foot level of Belcher will lead to a general prospecting of the lower levels of the Comstock, and that it will be possible to resume the work of sinking some of the deep vertical shafts along the lode. He estimates that the cost of putting in the plunger pumps at the 1,400-foot level station of the Crown Point incline will not exceed $50,000, and as it will be shared in just proportion by all the companies in that section the individual cost will be light. His observations have satisfied him that there will be no difficulty in lowering the water. He says that it frequently lowers 50 feet of itself, and that it has weakened, and cites the fact that with one Cornish pump the Alta people, whose mine is southeast of the main group, lowered the water at Gold Hill 200 feet, and easily held it there until they became tired of doing the drainage work of other mines for nothing. This is a general outline of the proposed work. It has already been agreed upon by the mine managers, and will in a few days be ratified at a meeting of the Boards of Directors of the companies.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—After paying the dividend, amounting to $108,000, on the 10th inst., and all expenses for the past month, this company carried over into the present month a net coin surplus of about $20,000. The expenses at the mine for August amounted to $164,452.13, and included $44,337.50 for salaries and wages, $22,586.59 for mine supplies, $249.75 for transportation and hauling, $1,912.29 for assaying, $75,186 for reduction of ores, $12,531 for Sutro tunnel royalties, and $6,849.80 for State and county taxes. Owing to the smallness of the surplus carried over—$20,000—it will be difficult to earn a dividend for October, and the San Francisco *Report* claims to be officially informed that none will be declared in that month. The annual meeting of the company will be held October 14th.

PENNSYLVANIA.

YORK COUNTY.

Deposits of gold, said to be in paying quantities, it is reported, have been discovered in the neighborhood of Hanover, nine miles below York, in this county. Prof. Joseph Coombes, of London, mining expert, has for six weeks been making examinations of the mineral properties of the vicinity, and reports that he has found strata there containing valuable leads of gold, besides copper and asbestos. He has succeeded in

securing a number of the properties containing the deposits, and on the 21st inst. he sailed for London from New York to perfect plans with British capitalists for beginning mining operations at an early date.

COAL.

The New York, Susquehanna & Western Company is reported to have purchased 60 acres of coal lands in Old Forge township, Lackawanna County.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to September 14th, were as follows:

	1889. Gals.	1888. Gals.
From Boston	3,336,469	2,844,006
Philadelphia	107,053,721	26,657,037
Baltimore	5,748,611	5,641,387
Perth Amboy	12,983,385	16,592,941
New York	323,128,834	252,897,828
Total exports	452,251,020	374,633,199

UTAH.

BEAVER COUNTY.

HORN SILVER MINING COMPANY.—During August the Horn Silver Mining Company was not able to ship as much of its ore to Salt Lake as usual, owing to a washout on the Utah Central Railroad, which interrupted traffic for some time. The ore sales for the month were consequently light, and the company was not able to add the usual amount to its cash surplus. It succeeded, however, in bringing this surplus up to $243,000 on September 1st, an increase of $4,000 as compared with August 1st. Secretary Harrison informs us that there was no falling off in the production of the mine. The output was 1,010 tons, of which 700 tons were sold. The gross amount realized from sales was $13,400. There will thus be some 300 tons of ore to be added to this month's output, which the officers of the company say will be up to the average, and the profits for this month should therefore compensate for the falling off in August, barring accidents, of course.

VIRGINIA.

[From our Special Correspondent.]

A mineral railroad is being constructed from Gala Water, on the Chesapeake & Ohio Railroad to Newcastle, to develop the ore property in that region.

ALLEGHANY COUNTY.

STACK.—The owners of these mines will add eight jigs to their present washing plant. Mr. John S. Iam, superintendent, has made a recent trip to Pennsylvania to observe the workings of the jigs at the Bellefonte mines.

WISCONSIN.

ASHLAND COUNTY.

IRON BELT.—Late information confirms the report printed in the last issue of the ENGINEERING AND MINING JOURNAL that work on this property, erroneously called the "Iron Bell," has been suspended for the winter.

FOREIGN MINING NEWS.

CENTRAL AMERICA.

HONDURAS.

ZELAYA MINING COMPANY.—A suit has been brought in the Court of Common Pleas, New York City, by Mr. Adam D. Blocker against this company and Alexander Guild, its president, to recover some $800, which he claims to have lost through the purchase of stock of the company upon fraudulent representations as to its value. He obtained an order for examination of the officers before trial, and they now seek to have the order set aside. Judge Van Hoesen has heard argument and reserved decision. Mr. Blocker says the company set forth in a printed circular that it owned two thousand acres of land in Honduras rich with valuable gold deposits, and that the purchase of its stock would be a good paying investment. He declares this statement to have been an alluring wile, whereas the company avers that all its statements were correct. The order obtained by the plaintiff for the examination of the officers of the company before trial was before Judge Van Hoesen last week on a motion to have it vacated. After hearing, the judge took the papers.

MEXICO.

SONORA.

It is reported that Messrs. Hayward & Hobart, well-known mining operators, have concluded the purchase of the Mulatos mining district in Sonora for $1,750,000. This district includes a dozen good mines, which, when developed, ought to yield large returns. The purchasers gave a mortgage on San Francisco property for $800,000. It is the biggest mining investment recorded there for many years.

ORE MARKET.

Leadville. Sept. 16.

[From our Special Correspondent.]

The market during the past thirty days has been featureless, and there is no change in the schedules of a month or more ago. All of the smelters of Leadville and the valley are abundantly supplied with dry silicious ores, and the working charges continue at $13 to $17 per ton.

Lead zinc sulphides rule steady at the old scale of

Lead, per cent.	Price per unit.	Working charge.
10 to 20	15 to 20c.	$12.00 to $14.00
20 to 30	20 to 30c.	11.50 to 13.50
30 to 40	30 to 35c.	11.00 to 13.00
40 and over	35 to 40c.	10.00 to 12.00

For the silver, 90 to 93 per cent. of New York quotations.

Lead basis $4 per hundred, New York quotations, add or deduct 1c. for each 5c. charge. Deduct 50c. for each per cent of zinc over 16 per cent.

There is of late more inquiry for clean iron pyrite, but the offerings are light, for the reason that in the past the market was easily overstocked, and the miners do not realize that a much larger quantity can now be utilized, owing to the increased roasting capacity of the smelters. Straight pyrites usually run low in silver and gold, so the value per ton averages but little better than iron oxide fluxing ores, but they are frequently more easily and economically mined, and the probabilities are that as the miners' attention is called to the changed condition of affairs, pyrites will become a more important product in our market.

All the lead carbonates that are presented find ready sale at the stereotyped price of 40 and 35 for 30 and over.

The activity in iron oxide fluxing ores, noted in my review of August 16th, has not abated, the effect of the causes then existing, of several smelters contracting about the same date and requesting shipments at once, even in excess of their immediate requirements, resulted in an effort on the part of the miners to increase their output beyond their capacity, and this was followed by a confirmation of "the greater the speed the worse the haste," for an unusual number of breakages of machinery occurred, so that the output instead of being increased fell rather below the average. While all of this has not caused an advance, prices are firmly sustained and desirable grades may be quoted at: 8 to 10 ounces, 47½c.; 10 to 12 ounces, 50c.; 12 to 14 ounces, 52½c.

Basis 40 per cent. basic excess, add 10c. for each unit above basis; deduct 15c. for each unit below basis.

MEETINGS.

Breece Mining Company, 115 Broadway, New York, October 2d, at two P. M. Transfer books closed September 28th and re-open October 3d.

Buckeye Mining Company, South Butte, Montana, October 2d, at eight P. M.

Butte & Boston Mining, 23 West Granite street, Butte City, Montana, October 2d, at two P. M.

Colorado Oil Company, No. 280 Broadway, New York City, October 7th, at twelve o'clock, noon.

Crescent Mining Company, McCornick & Co.'s Bank, Salt Lake City, Utah, October 16th, at ten-thirty A. M. Transfer books close October 12th.

Eureka Consolidated Mining Company, 306 Pine street, San Francisco, Cal., October 21st, at half-past eleven o'clock A. M.

Mount Pleasant Mining Company, 18 Wall street, New York City, October 2d, at twelve o'clock noon.

Ophir Gold Mining Company, 12 Maiden lane, New York city, October 1st, at twelve o'clock noon.

Pacific Electric Motor Company, 12 Annie street, San Francisco, Cal., October 8th, at 10 A. M.

Phœnix Mining Company, of New York, 35 Pine street, New York City, October 10th at three-thirty P. M. Transfer books close October 5th, and re-open October 11th.

Presidio Mining Company, 309 Montgomery street, San Francisco, Cal., October 7th. Transfers close October 5th.

St. Louis Smelting and Refining Company, St. Louis, Mo., October 5, at nine A. M.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alliance, Utah	....	Sept. 11	Oct. 15	Nov. 5	.10
American Gulch, Mont	....	Aug. 31	Oct. 12	Oct. 30	.02
Anchor, Utah	....	Aug ..	.....	.....	.20
Apex, Utah	....	Sept. 16	Oct. 21	Nov. 11	.05
Bellevue-Idaho, Id.	....	Aug. 17	Sept. 23	Oct. 12	.10
Best & Belcher, Cal.	44	Sept. 11	Oct. 16	Nov. 6	.25
Bulwer Cons., Cal.	6	Aug. 6	Sept. 12	Oct. 10	.25
Challenge Con., Nev	5	Aug. 6	Sept. 9	Sept. 30	.50
Chicago Mill & Mg. Co., Cal	2	Sept. 13	Oct. 18	Nov. 4	.15
Cons. New York, Nev	1	Aug. 14	Sept. 18	Oct. 9	.25½
Crown Point, Cal.	52	Sept. 18	Oct. 21	Nov. 11	.50
Del Norte, Cal.	2	Aug. 24	Oct. 3	Oct. 26	.07½
Double Stanard, Dak	3	Aug. 29	Oct. 2	Oct. 18	.00½
East Sierra Nevada, Nev	1	Aug. 8	Sept. 13	Oct. 7	.10
Gray Eagle, Cal.	14	Aug. 13	Sept. 16	Oct. 8	.04
Grey Eagle, Dak	2	Sept. 10	Nov. 9	Nov. 30	.00½
Keyes, Nev	4	Aug. 27	Oct. 1	Oct. 21	.30
Livermore, Cal.	1	Sept. 18	Oct. 19	Nov. 6	.50
Mono, Cal.	28	July 24	Aug. 28	Oct. 1	.50
North Belle Isle	16	Sept. 18	Oct. 22	Nov. 13	.20
North Carolina, Cal.	13	Aug. 6	Sept. 23	Oct. 8	.10
Palisade, Cal.	1	Aug. 6	Sept. —	Oct. 2	.10
Peer, Ariz.	8	Sept. 4	Oct. 10	Nov. 5	.10
Potosi, Cal	33	Sept. 18	Oct. 22	Nov. 12	.50
Scorpion, Nev.	1	Aug. 8	Sept. 13	Oct. 7	.10
Scott Bar, Cal.	3	Sept. 10	Oct. 12	Oct. 31	.10
Union, Utah	....	Sept. 6	Oct. 10	Oct. 30	.00½

* Delinquency and day of sale postponed to dates given above.

DIVIDENDS.

Dunkin Mining Company, dividend No. 30 of five cents per share, or $11,000, payable October 15th by Farmer's Loan and Trust Company, 22 William street, New York City. Transfers close October 2d.

Monitor Mining Company, dividend No. 2 of five cents per share, or $12,500.

North Star Gold Mining Company, dividend No. 4 of fifty cents per share, or $50,000, payable September 30th to stockholders of record September 25th at No. 18 Wall street, New York City.

Pennsylvania Gas Coal Company, quarterly dividend of one and one-half per cent., payable September 26th. Transfers close September 16th.

Sloss Iron & Steel Company, dividend of two per cent., payable Oct. 1st by Central Trust Company, 54 Wall street, New York City.

Thomson-Houston International Electric Company semi-annual dividend of three and one-half per cent. on preferred stock, payable October 10th to stockholders on record October 1st.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 283 and 284.]

New York.

FRIDAY EVENING, Sept. 27.

The volume of business in mining shares has been ligther this week than last, but as compared with previous weeks sales have been larger. The tone of the market continues rather improved, although as yet most of the trading has been in such "specialties" as Phœnix of Arizona and Brunswick, shares that are at present purely speculative. There are, however, a number of stocks of some known value that under liberal buying might be made sufficiently active to induce a good deal of speculation, for the speculative fever of "the public" never dies out, and there are also a number of stocks that may be justly ranked as investment securities. Last year was probably the dullest in the history of mining speculation in New York; it is to be hoped that some of the old time activity may revive this fall. If there is one thing more than another that mining share dealers and promoters should have learned from the depression of recent years, it is that honesty is beyond all doubt the best policy. Even the "public," innocent and confiding though it be, sooner or later gets tired of a "Heads I win, tails you lose" game. Mining as an industry was never in a more prosperous condition; more money and more machinery is going into American mines than ever before. Mining as a business pays; as a gamble, it does not.

Phœnix of Arizona continues to be the most active share on the list. It has shown a declining tendency, opening on Saturday last at 57@60 and selling to-day at 49@51c., a gain of 11c. over the lowest price of the week. Sales for the week aggregate 9,150 shares. The annual meeting will be held in this city October 10th.

Brunswick has continued active but heavy selling has weakened the price from 8 cents to 4 cents. It is said that the treasury stock of the company is now being unloaded on the market for the purpose of raising funds to enable the management to resume work on the property. Some months ago, according to the official statement of the president (see ENGINEERING AND MINING JOURNAL, August 31st), the company was about $20,000 in debt.

Astoria continues to change hands freely at 20c. per share.

Bodie Cons. is firmer than at the time of our last report. Light transactions at 80c. are reported. Standard Cons. is steady and quiet at $1.

As the ENGINEERING AND MINING JOURNAL last week announced that he would, President Warner Van Orden, of the Plymouth Cons., returned from Europe this week. In speaking with a representative of the JOURNAL shortly after arrival yesterday, Mr. Van Orden said: "I am sorry to see that the ENGINEERING AND MINING JOURNAL has given credence to the absurd reports that have been circulated by unreliable papers in the vicinity of the Plymouth mine. The policy of this company is now, as it always has been, to afford its stockholders and the public generally all the information in its possession, and for this reason we think that only statements that are known to be correct should be published. The management of the property has been left to Messrs. Hayward and Hobart, who are virtually on the ground, and as they have acted prudently in the past, I believe they have done so now. It is certainly very improbable that they have sold the hoisting works or any portion of the mill, as has been stated. In regard to Supt. E. L. Montgomery's resignation, I may say that it has been contemplated for some time past. He has been with us about eight years. Of late he has been afflicted with ill health, and as he is advancing in years he has desired to resign. His place is ably filled at present by Mr. Jones, our foreman, who has been in our employ about thirteen years. Mr. Montgomery would have resigned under any circumstances. All that I know about the mine just now is what our foreman writes—that owing to the cave-in, and the unsettled condition of the ground after the fire, work has been dangerous to the miners, and the force has consequently been reduced. I expect full advices from San Francisco shortly, when a meeting of the board of directors will be held and a complete statement will then be made to the stockholders. During my absence, the information received at the New York office has not been as complete as usual. I notice it has been said that the recent fire in the Plymouth mine was simply a fiction, and that the misfortunes of the company have been

worked for the benefit of the stock operations of its officers. For months past I have neither bought nor sold a share of the stock. Messrs. Hayward and Hobart are men of wealth and reputation, who are too discreet to do anything that would expose them to criticism, and, moreover, they own property in this city which would make them liable in case their actions were in any way dishonest or illegal" One sale of the stock was made to-day at $30.

The North Star Gold Mining Company, of Grass Valley Cal., which of late years, under the management of Mr. James D. Hague, has prospered exceedingly, comes to the front with the announcement of dividend No. 4, of fifty cents per share, or $50,000, payable September 30th. This is the first dividend paid this year, and makes $200,000 paid by the present company to date. In the first week in September President Hague told the readers of the ENGINEERING AND MINING JOURNAL that this dividend would probably be paid before the close of the month.

Quicksilver preferred is slightly weaker at $35.

No substantial improvement is noticeable in the Comstock shares, but if some of the exploitation work on the Lode which is said to be in contemplation is carried out, greater activity will doubtless result The work proposed is given in detail in our mining news columns. This week, Con Cal. & Va. sold at $7.25@$6 50, Belcher, $3; Ophir, $4 60; Yellow Jacket, $3.30; Utah; $1.10@$1 25; Potosi, $1.35@$1.50; Oriental & Miller, 5@6c; Occidental, $1 45@$1.50; Mexican, $4; Julia, 35c.; Alta advanced from $1.90 to $2.50; Best & Belcher sold at $3.25, and Bullion at 85@75c.

Sutro Tunnel old stock was sold only on Wednesday, and the Trust Certificates on the day previous. Quotations are 5 and 62c, respectively. Brokers are inclined to regard the new securities rather distrustfully. Next week we will probably be able to say something more definite on the subject.

Eureka is firmer with no sales.

The Tuscarora group is represented by transactions in Belle Isle at 15c. and Navajo at 35c. The public took rather kindly to the shares last year, but the "queer" management of some of the mines has now well-nigh disgusted investors.

We have received inquiries concerning the prospects and financial condition of Barcelona, a stock which in times was one of the most active on the list. It has been listed on the Consolidated Exchange for many years, but until 1886 it was rarely seen on the sales list. In March, 1886, a quotation of 3c. per share appears on the record, and from that date the price rose slowly throughout the year 1886 to 24c. in December.

In 1887 the advance continued until November, when the quotation of 68c. was reached. In December values began to weaken, and in the first few months of 1888 quotations as low as 40c. were recorded. Early in the year, however, the stock took another start. A rich strike in the mine was reported, and it was stated that Governor Bodwell of Maine had invested largely in the shares. In June, 1888, the boom reached its apex and the "public" absorbed the shares very liberally. During the month sales were made at $1.30. It was about this time that specimens of silver ore calculated to tempt the most wary of investors were exhibited on the Exchange. For some unaccountable reason, however, its glories soon began to fade, and the price of the shares began to droop. In December, 1888, 63c. was the recorded quotation, and to-day 20 cents can be considered about the top of the market. The directors of the company elected at the last annual meeting were as follows: A. J. Severance, J. F. Bodwell, Geo. Doyle, Wm. A. Righter, J. C. Simpson, D. P. Day, Geo. W. Rosevelt, Jr., nearly all of whom are New England men. The property, which, it will be remembered, is located in Nye County, Nev., for some time past has been under the management of a nephew of Mr. A. J. Severance, the moving spirit of the enterprise.

As intimated last week, the Eastern stockholders of the Silver King Mining Company, of Arizona, are beginning again to complain that, although the majority of the stock is held in this section of the country, the management of the company is entirely under the control of a San Francisco clique, the well-known "Bonanza" firm, who, as usual, are managing the enterprise solely for their own benefit. It is said that efforts to secure a proper representation of the Eastern holders at the annual election next January will be renewed this fall, but unless their efforts in this direction are of a different character to what they were last year it is to be feared that little will be accomplished. So far as can be learned only development and exploitation work is being done in the mine. Those in charge say they have "lost the vein," and are crosscutting, we believe, on the 890 foot level in the hope of finding it. So far their work, it is said, has been fruitless, and the surplus in the company's treasury is being steadily reduced. On September 1st it was reported as $26,000. The stock has been active this week at 65@85c.

The annual election of trustees of the Horn Silver will be held in Salt Lake City on Tuesday next, October 1st. President Allan C. Washington and a number of other New York stockholders will be present. Mr. Washington intends to personally examine the company's property. It is to be hoped that he will then be able to inform us as to the accuracy of the expert report on the mine some months ago, which it will be remembered was not so encouraging as to the future of the property as might be wished. The shares have been fairly active and slightly weaker at $1.25@1 45. Ontario sold at $35@$35 25.

Among the Dakota stocks, Deadwood Terra has advanced to $1.60. Homestake sold at $9.13. The annual report has just been published.

From the Caledonia Mining Company word comes that the gross product for August was $24,600. No one pretends that this property is a bonanza, but it earns just enough every month to pay a dividend of $8,000, or eight cents per share. It has done this fourteen months, and has also, it is said, accumulated a reserve fund of some $40,000. The stock is firmer at $3.05.

The stockholders in the El Talento Mining Company, of the republic of Colombia, have come to the conclusion that they were badly deceived when they purchased their stock, and an effort is being made to get these dissatisfied stockholders together to ascertain if some legal action cannot be taken against the promotors of the enterprise. In speaking of the matter, one of the stockholders said this week: "This stock, it will be remembered, was floated early in 1887, during the boom in El Cristo. Both properties are in the same territory. The original promoters of El Talento were Messrs Harpending and George D. Roberts, well known for their connection with many unfortunate mining schemes. When the memorable drop in El Cristo occurred in March, 1887" (See ENGINEERING AND MINING JOURNAL, April 2, 1887: "El Cristo in a Bear Garden"), "these gentlemen pretended to have a falling out and their partnership was dissolved, Mr. Harpending taking El Cristo and other properties, and Mr. Roberts the El Talento. The latter then proceeded to re-organize the company and to enlist fresh capital in the enterprise. I believe for this purpose he secured a considerable amount of money, and many of his friends were induced to purchase the stock on his representation that dividends would soon be forthcoming. Mr. Roberts said that for the purpose of freeing the company from any entangling alliances, an entirely new board of management should be chosen. On January 5th, 1888, the following officers were elected: Wm. H. Ritter, Jos. Roma, J. V. V. Olcott, Alfred R. Kimball and William Allen Smith In March, 1888, Mr. E. E. Olcott, the brother of J. V. V. Olcott, and a well-known engineer of excellent reputation, was sent to examine the property. On his arrival there he is said to have cabled his father-in-law, who was largely interested in the stock of the company, as follows: 'Get additional security from Roberts' Shortly afterward he returned, but we stockholders were never able to learn the nature of his report. It was sufficient for us, however, to know that Mr. Olcott's relative, one of the largest shareholders of the company, refused to advance any more money, and work of all character was thereupon suspended. Furthermore, as soon as Mr. Olcott returned, the entire board of directors, whom I believe to be reputable men, resigned. Since then I have never been able to find out anything about the company or to ascertain the value of my stock."

From other sources it was learned that the present officers of the company are Messrs, Henry Cummins, President, and C. A. Alden, Treasurer and Secretary. No work is being done upon the property, owing, the officers say, to the lack of funds, and to the unwillingness of the stockholders to make any futher contributions. The stock is non-assessable. Mr. E. E. Olcott is out of town at present.

Mr. George D. Roberts is in town. One of his representatives, when seen by an ENGINEERING AND MINING JOURNAL reporter, said that Mr. Roberts' relations with the company were simply those of a stockholder.

Mr. A. P. Harpending says that he knows nothing of the El Talento Mining Company and that he has not seen nor spoken to Mr. George D. Roberts for some time past.

The Governors of the Stock Exchange have admitted to dealings at the Board an additional $146,000 consolidated first mortgage 6 per cent. gold bonds of the Tennessee Coal, Iron and Railroad Company, making total amount listed $1,400,000.

It has been on the whole an uneventful week for the Colorado shares. Little Chief has been quiet at 35@38c. Stockholders should remember the annual meeting next Tuesday. Leadville Consolidated has reappeared on the active list, after being neglected for some time. Quotations are recorded at 7@9c. Plutus sold at 71@75 and Robinson Consolidated at 50c. The shrewd manipulators of Ward Consolidated have not relaxed their endeavors to keep the stock active, but the price has steadily declined from $1.65 on Saturday to $1.15 to-day. Lacrosse has been traded in at 7c.

Silver Cord sold to-day at 70c. The company's secretary thinks that another $50,000 dividend will probably be paid before the end of the year. Dunkin has declared a 5c. dividend as predicted in the ENGINEERING AND MINING JOURNAL last week, all rumors to the contrary notwithstanding. 70c. is bid for the stock.

Those who have been perplexed at the seemingly inexplicable fluctuations of El Cristo from time to time will be interested in the statement of a veteran speculator, who, it may be said, has a standing order in the market for the stock, at a low price. "Friend Harpending," said the party referred to, "has some four or five thousand shares of the large amount of stock that he holds reserved for trading purposes. As soon as Cristo begins to hover around the dollar mark, he quietly unloads a portion of this stock and speculators take it in. He continues to sell till he gets the price down fifteen or twenty points, and then, as holders get frightened, he loads up again. This process of manipulation is then repeated. You will readily see that the difference between his buying and selling prices nets him a comfortable little profit whenever he chooses. Any one looking over the record of the fluctuations and noting the lightness of the sales can easily verify my hypothesis." This may or may not be true, but as a piece of interesting reading in dull times it is well worth preserving. The stock sold this week at 95c.@$1 to the extent of 200 shares. Colchis of New Mexico has been fairly active at $9 50@9.88, which, it seems to us, is a very marked advance over its price of several months ago.

Large sales of Shoshone are reported at 2c.

Rappahannock is still active at 6@7c.

United Copper sold at $1.10@$1.20.

St. Joseph Lead Company stock is weaker, being offered at $15, and $14.50 bid:

Boston. Sept. 26.

[From our Special Correspondent.]

The market continues dull, with very little to encourage operators or investors. There is a dearth of orders, either to buy or sell. The outside public do not see any inducement to do anything under the existing state of the market, and what little business there is is by room traders, who try to scalp the market whenever an opportunity offers.

Calumet & Hecla declined from $220 to $214, with sales to-day at $215. The output last week was very nearly 700 tons, which if continued this year and sold at a net profit of 5c. per pound would give enough to pay over $25 per share in dividends.

Tamarack has been in fair demand for small lots, and held quite steady at $106¼ to $106½ until yesterday, when a larger lot than usual coming on the market, the price dropped to $105.

Boston & Montana has been in better request with less stock offering, and the price has been well maintained at $34½ to $35.

Quincy steady at $49½ to $50 on small sales.

Osceola sold at $10, same as last week.

Atlantic sold at $7½, a decline of $2 since last sale, Aug. 23.

Franklin declined from $9⅛ (Sept. 3) to $8¾ for 50 shares.

Pewabic sold at $2¼, same as last sale (May 13).

Santa Fe declined to 50c.

Dunkin sold at 75c. As we predicted in our letter last week, the directors at their meeting yesterday declared the usual quarterly dividend of 5c. per share, payable Oct. 15. There will be in the treasury, after paying this dividend, $28 000 or $30,000. The question of purchasing the adjoining territory has not as yet been acted upon. The parties who sold their stock on the rumors current the past two weeks about passing the dividend are now anxious to get it back and were bidding 80c. for it to-day without getting any.

Napa Quicksilver sold at $4.

There was no change at the afternoon call.

Market closed dull.

St. Louis.

On the 19th inst. 475 shares Granite Mountain Mining Company's stock of Montana, which had been placed as collateral, was sold in four lots at public auction in this city. The bidding was spirited, the prices realized varying from $40 to $47. The total amount realized was $20,800.

Gogebic Stocks.

"Many relics of the Gogebic mining craze have recently come to the surface in the Supreme Court," says the Milwaukee *Evening Wisconsin*, "in the form of decisions in a number of suits resulting from the big deals in mining property of two and three years ago. The most important suit is that growing out of the failure of John E. Burton, the ex mining king, entitled the Central Trust Company of New York versus Burton. In the suit the former applied in the Circuit Court for Walworth County for a receiver of property mortgaged by Burton to secure notes for $330,000 given the trust company. Burton set up a defense of usury. The trust company demurred to the answer, and the Circuit Court overruled the demurrer, and also refused to appoint a receiver. The trust company then took an appeal, but the Supreme Court affirms both orders appealed from."

Electric Stocks.

The Thomson-Houston Company has called a special meeting of stockholders at New Britain, Conn., on September 28th, to decide if common stock shall be increased from 120,000 shares to 180,000 shares of the par value of $25 each and to see if stockholders will change place of holding annual and special meetings to some other town in Connecticut.

The Thomson-Houston Electric Company has issued a circular declaring a dividend out of the net profits, payable to holders of the common stock of record October 5th, and payable by a distribution of certain assets of the company. The transfer books will close from October 6th to October 10th, inclusive. This dividend will probably be the Series D that has been talked of lately.

Auction Sales of Stocks. Sept. 28.

The following securities were sold at public auction in New York this week:

100 shares Carbonate Hill Mining Company, 50 cents per share.

220 shares Indian Queen Mining and Milling Company, 50 cents per share.

250 shares New York, Lackawanna & Western Railroad Company (5 per cent. guaranteed Del., Lack. & West. R. R.), 112.

6 shares Pennsylvania Coal Company, 310.

100 shares San Miguel Gold Placer Mining Company, $1.10 per share.

18 shares Standard Oil Trust, 172¼@171.

PIPE LINE CERTIFICATES.

(Special Report by Messrs. WATSON & GIBSON.)

The petroleum market continues to rule in the neighborhood of 99c., but without any speculative interest. The consumption exceeds the production at the rate of three-quarters of a million barrels per month, but this does not appear to excite enough outside interest to either stimulate activity or values The Standard Oil Company doubtless controls the bulk of the petroleum, and it shows no disposition whatever to make a speculative market for it.

The prospect is that the Consolidated Exchange will return to the old system of trading, under which bids meant a delivery of the oil purchased on the day following the transaction.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales
Sept. 21.....	100	100	99⅞	100	52,000
23.....	99⅝	100⅜	99⅝	99¾	93,000
24.....	99⅜	99⅝	98¼	98¼	193,000
25.....	98⅛	99	98⅛	98⅞	104,000
26.....	99⅛	99⅛	98¾	99	85,000
27.....	99⅛	99¼	93⅜	98⅞	80,000
Total sales in barrels.....					604,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 21.....	100¼	101¼	100⅛	100¼	54,000
23.....	100	101⅛	99¾	99¾	158,000
24.....	99⅝	99⅝	98⅛	98¼	603,000
25.....	98¼	99⅛	98¼	98⅞	330,000
26.....	99⅛	99⅛	98¾	99	336,000
27.....	99⅛	99⅜	98⅜	98⅝	325,000
Total sales in barrels.....					1,806,000

A petition has been circulated on the Consolidated Stock and Petroleum Exchange requesting the board of directors to consider a modification of the rules governing trading in national transit (petroleum) certificates, and take action to secure its adoption by the Conference of Oil Exchanges. At present all "regular way" trade is in oil deliverable at the option of the seller in the month following that in which the transaction takes place. The change asked for is a return to the old "regular way," which makes oil sold deliverable the following day. Traders will be left at liberty to deal in options by specifying the month when bidding or making offers. The following names among others have been secured to the petition: W. S. Naley, S. L. Roseburg, Stettheimer & Bottman, George H. Lincoln, L. H. Smith, S. T. Hubbard, Watson & Gibson, Mathew A. Van Winkle, Charles H. Nelson, A. D. Blocker, D. W. Lyons, W. H. Coon, George A. Nelson, E. R. Betts, Samuel White, Jr., E. R. Grant, John T. Lee, George Hartz, Isaac Sonneberg, W. Fisher, George W. Fuller, Jr., A. Dutenhoffer, H. M. Curtis & Co., J. W. Copmann, Hubbard, Price & Co., Samuel Ames, H. M. Martin & Co., J. C. Crevier, Young & Stephenson, Moller Bros., H. O. Beebe, G. W. Thumm.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 27.

Statistics.

PRODUCTION OF ANTHRACITE COAL for week ended September 21st and year from January 1st.

Tons of 2,240 lbs.	1889. Week.	1889. Year.	1888. Year.
P. & Read. R.R. Co.....	169,123	4,956,568	4,749,924
Cent. R.R. of N. J.....	123,977	4,207,232	3,960,642
L. V. R.R. Co.....	175,000	5,280,755	4,720,961
D., L. & W. R.R. Co.....	115,590	3,655,240	4,792,823
D. & H. Canal Co.....	65,300	2,744,018	3,177,731
Penna. R.R.	56,219	2,318,952	3,272,820
Penna. Coal Co.....	23,917	931,477	1,204,419
N. Y., L. E. & W.....	14,500	800,628	626,087
Total.....	740,536	24,921,870	26,505,407
Decrease.....	.....	1,580,537	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent. of the whole production.

These figures are subject to corrections for duplications.

Production for corresponding period:

1884.....	22,350,857	1886	22,170,420
1885.....	21,250,857	1887.....	24,185,420

PRODUCTION OF BITUMINOUS COAL for week ended September 21st. and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2,240 lbs.	1889. Week.	1889. Year.	1888. Year.
Phila. & Erie R.R.....	2,863	52,199	45,375
Cumberland, Md.....	51,049	2,201,881	2,57,,884
Barclay, Pa.....	3,500	81,448	118,680
Broad Top, Pa.....	8,523	232,975	250,826
Clearfield, Pa.....	66,234	2,225,365	2,426,664
Allegheny, Pa.....	16,275	569,083	559,706
Beach Creek, Pa.....	31,038	1,077,495	1,217,265
Pocahontas Flat Top.....	13,638	1,223,602	1,001,747
Kanawha, W. Va.....	40,000	1,303,555	1,141,113
Total.....	233,216	8,967,544	9,334,260

WESTERN SHIPMENTS.

Pittsburg, Pa.....	15,052	453,879	514,014
Westmoreland, Pa.....	30,098	1,044,712	1,105,436
Monongahela, Pa.....	6,204	289,476	293,001
Total.....	51,354	1,788,067	1,912,451
Grand total.....	284,570	10,755,611	11,246,711

PRODUCTION OF COKE on line of Pennsylvania R. R. for week ending September 21st, and year from January 1st, in tons of 2,000 lbs.: Week, 93,552 tons; year, 3,110,416 tons; to corresponding date in 1888, 2,826,183.

Anthracite.

The slight improvement noted in this market last week continues. Prices vary according to the necessities of sellers, but on the whole they have not quotably changed since our last report. In some quarters it is claimed that the top quotations previously named are obtained more easily than heretofore. Lehigh broken remains at $3.90 to $4; egg continues to be quoted at $4 For stove $4.15 is quoted, and chestnut at $3 85 to $4. Pea is not so plentiful, with quotations now at $2.50. Cars have become more widely distributed and there is apparently little blockage at seaboard. Coal afloat is reported to have been sold at slightly better prices.

The subject of the discrimination in tolls on the various sizes of anthracite to which we referred in our last issue has attracted considerable attention. One well-known producer says that if such a road as the Delaware, Lackawanna & Western, for instance, chooses to class all such freight simply as coal, without regard to size, as it does at present, the Inter-state Commerce Commission may probably take the same view of the matter. On the other hand it is argued that a railroad must adapt its freight charges to the conditions of trade, otherwise it will become a burden and not an aid to business. In other classes of merchandise, suitable classification is provided and charges are fixed according to the value of the goods and not according to their bulk. This classification is enforced on iron ore, the transportation of which of course is very similar to that of coal. The Pennsylvania Railroad Company showed its appreciation of this fact when it said to the bituminous producers; "If you cannot pay a cent a ton-mile, what rate can you pay?" and upon receiving their answer, promptly fixed its charges so as to afford them an opportunity to ship their coal. Any other course would have closed the bituminous mines, and the consequent loss of their freight would have reacted upon the railway.

Bituminous.

There is very little news to report concerning the soft coal trade. A liberal demand is generally reported, and there is apparently no accumulation at tidewater. The prices remain about the same as last week, viz $2 00@$2.50 f. o. b. Philadelphia & Baltimore, $3 25 f. o. b. New York and $3 50 alongside at this port, at least this last is the nominal figure. The assemblage of vessels at Boston shortly after the recent storm has now been dispersed; but freight charges show but little weakness, and vessels are said to be rather scarce at Philadelphia and Baltimore. Owing to the scarcity of cars, however, there has been a decreased amount of coal brought to tidewater, and the supply of vessels at present is consequently sufficient for current needs, but with the ordinary amount of coal more vessels would be required.

It is reported that the Beech Creek Railway has ordered 500 new gondola cars. The scarcity of cars on the B. & O. road is attributed to the fact that the repair shops are closed, and there are a large number of cars awaiting repairs which are unavailable for shipping purposes. As President Mayer, the present head of the B. & O. Railway, was formerly the President of the Consolidation Coal Company, it was thought that he would look out for the interests of the coal trade better than he has done, but the fact of the matter seems to be that the downward course in the management of the road, which was inaugurated by the last of the Garretts, is still to be pursued. The lack of cars on the Pennsylvania Railroad is said to be due to the fact that most of its rolling stock of this description is now being used for construction purposes, that is, carrying dirt and material to repair the damage to the road occasioned by the storm in June.

The break up of the iron-clad compact of last spring between the soft coal producers, which was first openly brought about by the Norfolk & Western putting down its prices on Flat Top coal to $2 per ton f. o. b. vessels, is likely to bring about a great change in the policy of the Chesapeake & Ohio road toward its coal producing interests.

The rate of $2 a ton leaves the operators on the New River & Kanawha only a bare living margin, while it brings the freights down to less than ¼ cent per ton-mile on the road. The Pocahontas district can mine cheaper than the New River-Kanawha mines, and this last price would have closed these mines. Fortunately for the Cincinnati & Ohio, the miners at Hawk's Nest, which has been closed for some years, are capable of competing with the Pocahontas mines, and can produce coal at even a less cost than these, and the new and more intelligent management of the Cincinnati & Ohio Railroad, appreciating this fact, are offering inducements to have these mines worked to their fullest capacity. There will then result a second "Pocahontas" in the market, which can live at remarkably low prices, and must be taken account of in the next distribution of tonnage at the annual farce next spring.

An order has been given by the Beech Creek Railroad for 500 gondola cars, and it is reported that the Vanderbilts intend to develop the property. The latter rumor gives rise to the intimation that the charter of the South Pennsylvania is to be transferred to a third party, who is friendly to the Pennsylvania Railroad, and that no opposition will then be made from the latter quarter to the extension of the Beech Creek road.

Boston. Sept. 26.

[From our Special Correspondent.]

The anthracite coal market continues to show some signs of life, although it is far from being active. There is quite a little demand for hard broken and egg, but the movement in stove coal is very small as yet. F. O. B. prices are stiffening slightly, as was sure to be the case when there was any trade at all. The coal spell has been followed by the usual rainy weather which has so preponderated for many months now. The sales agents have a meeting in New York to-day, but the general opinion here is that the actual market prices will not be affected by anything they do.

The bituminous market is strong. Very little coal is selling now at less than $2 50 f.o.b. Cumberland coal is in poor supply. The Baltimore & Ohio Railroad does not catch up with its delayed coal transportation, and almost all shippers are behind in deliveries. Before the season is over Cumberland coal is likely to be firm at $2 60 f.o.b. Some kinds of Clearfield coal can still be had at very low figures.

The freight situation is changed a little. At New York rates have advanced about 5 cents, say to 80c. as a minimum. At Philadelphia and Baltimore there is no notable change, rates being $1 05 and $1 20, respectively. Barges are in great demand. Long Island Sound coal transportation in barges was seriously delayed by the late storm. The Bee Line did not move a barge for nearly two weeks. A good deal of complaint is being made here at the long tow-lines which some of the barge companies are in the habit of running, with three barges in line, stretching astern the best part of a mile, it would almost seem. It is claimed that this practice is fraught with danger to coasting vessels. The big fleet which left here some days ago has not yet been heard from at the coal ports, when it is rates are expected to ease off a little.

The retail movement is very slack yet. Prices are unchanged.

The receipts for the week were 66,700 tons anthracite and 37,819 tons bituminous, against 132,220 tons anthracite and 43,486 tons bituminous for same period of 1888. Since Jan. 1st receipts have been 1,151,640 tons anthracite and 663,905 tons bituminous.

Buffalo. Sept. 26.

[From our Special Correspondent.]

The anthracite coal market continues quite lifeless, although the cold weather for a few days caused a little spurt in orders for supplies for domestic purposes. Prices without any change, and retailers say that there should be a decline in quotations, for the figures are too high at present.

Bituminous coal in good demand and firm: supply only fair, but several varieties not on the market. The nominal quotations are for the Reynoldsville, the Allegheny Valley Railroad, the Mercer and low grade division of the Allegheny Valley Railroad regions: Screened lump, $2; lump and nut-mined, $1.90; run of mines, $1.75; screened nut, $1.75; nut and slack mixed, $1 50, and slack, $1.40, per 2,000 pounds on track in carloads. The termination of the strike in the mining regions will doubtless cause enlarged shipments and increased stocks.

With regard to the further demand for coal for upper Lake ports there exists considerable uncertainty, and the heavy fall trade which was expected some weeks since has not put in an appearance. The manager of one of the anthracite concerns says: "Lake Superior ports have about all the coal they want, and there is a great deal of coal in Lake Michigan ports unsold as everybody knows Besides this may be stated the fact that very many consumers had coal left over in their cellars 'out west' and elsewhere, which has to be taken into account."

Lake freights steady; a decline of 10 cents last Monday to Superior ports was made. Lack of cargoes offering was the cause of many vessels leaving with only deckloads of coal for ballast. Severe storms prevailed on the lakes for several days, but the insurance men, as far as heard from, have not had to pay for any product of the mines in consequence. Tonnage offered is abundant for Chicago and Milwaukee this morning.

The shipments of coal by lake from this port from September 19th to 25th, both days inclusive, aggregate only 48,265 net tons, namely, 21,360 to Chicago; 15,130 to Milwaukee, 3,500 to Duluth, 2,960 to Toledo, 660 to Detroit, 100 to Bay City, 1,500 to Superior, 700 to Saginaw, 800 to Washburn, 100 to Gladstone, 20 to Dover, 1,000 to Racine, 85 to Port Stanley, and 350 to Sandusky; total for season, 1,471,022 net tons.

The rates of freight were 50c. to Chicago and Racine; 25c. to Toledo and Sandusky; 40c.-30c. to Superior; 45c. to Gladstone, Sheboygan and Milwaukee; 40c. to Saginaw and Washburn, and 30c. to Duluth, Bay City and Detroit.

The receipts of coal by canal third week in September, 10,481 net tons; shipments, 441 net tons.

Canal freights active; boats wanted, but very scarce. Engagements of one load coal to Ilion at 90c. net free on and off; three loads to Syracuse at 70c. gross, free off, and one load to Syracuse, 75c. gross, free off only.

Pittsburg. Sept. 26.

[From our Special Correspondent.]

Coal moves along slowly, presenting nothing very new or important. Sixteen coal firms, 90 per cent. of the entire coal interest on the Monongahela, have made out their statements, which are now in the hands of the syndicate, being examined. They have until the 1st of January to decide. Market firmer; not quotably higher. Fourth Pool miners are still at work. Very little doing in the other pools.

The nominal rates are:

PRICE OF COAL PER 100 BUSHELS = 7,600 LBS.

First pool.....	$4.75	Fourth pool.....	$3.75
Second pool.....	4.50	Railroad coal.....	5.00@6.00
Third pool.....	3.90		

Connellsville Coke.—The big coal men have left for the Connellsville regions; there is no telling what

may happen in the near future. Operations and outputs: 75 plants for last week, 12,210 active and 1,480 idle ovens as against 12,112 active and 1,526 idle at date of last report. Production last week, 126,488 tons; previous week, 106 457 tons, increase 20,031 tons; shipments 6,400 cars; previous week, 6,307 cars, increase 93 cars. Prices: Furnace, $1.35—will be $1 50 Oct. 1st. Foundry $1.65 per ton crushed, $2.15 on board cars at works. Official notice of advance sent out.

FREIGHTS.

Rail and Lake Freight Rates from Pittsburg to the Northwest.—The Pennsylvania Company has issued notice at Pittsburg that on September 30th a reduction in rail and lake freight rates from Pittsburg to St. Paul and Minneapolis will go into effect. By lake the present rates are: First class, 75; second, 62; third, 55; fourth, 38; fifth, 29, and sixth, 26. On iron and steel, less than carload lots, 26, and carloads 26. The reduction will bring the rates down to 72½, 62, 39½, 32, 25 and 22½ in their respective classes, with iron and steel at 26 on less than carload lots and 22½ on carloads. The new tariff has been mutually agreed upon, it is said, by the Pennsylvania Company and the New York, Pennsylvania & Ohio Road. The cut was occasioned by the reduction announced on all-rail freight from Chicago to the Northwestern shipping points.

METAL MARKET.

NEW YORK, Friday Evening, September 27.

Prices of silver per ounce troy.

Sept	Sterling Exch'ge	Lond'n Pence.	N. Y. Cts.	Sept	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
21	4.87½	42⅛	92¾	25	4.87½	42 11-16	93⅛
23	4.87½	42 9-16	92⅞	26	4.87½	42 11-16	93⅛
24	4.87½	42 9-16	92⅞	27	4.87¾	42 11-16	93⅛

Council bills advanced ⅛d. on this week's allotment Silver market has been firm and advancing on continued demand for India shipment and British Mint.

Exchanges continue strong.

United States Assay Office at New York reports total receipts of silver for the week 150.000 ounces.

Secretary Windom has decided that in the purchase of silver for coinage into standard silver dollars he will hereafter accept the lowest offers for the amount required providing the price is within the market rate, as required by law.

This reverses the practice of the department under the last administration of making counter offers, and is a return to the practice which prevailed prior to 1885.

The change in practice is said to be due to representations by bankers and others that the practice of making counter offers was in effect an attempt by the government to bear the silver market by forcing down the market rate.

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting raised its minimum rate for discount from 4 to 5 per cent. During the week the bank lost £171,000 sterling bullion, and the proportion of its reserves to its liabilities was reduced from 42·52 to 42·13 per cent., against a decrease from 42 7 to 41 5-8 per cent. in the same week last year, when its rate of discount was 4 per cent. Thursday the bank lost £310,000 bullion on balance. The weekly statement of the Bank of France shows a decrease of 11,375,000 francs gold and 325,000 francs silver

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .72	$ —
Mexican dollars	.74	.74½
Peruvian soles and Chilian pesos	.72	.73½
English silver	4.85	4.90
Five francs	.94	.95
Victoria sovereigns	4.85	4.89
Twenty francs	3.88	3.93
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.75
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.65
Iron guilders	3.96	4.00

Copper.—The feeling with regard to the future course of the copper market has become a little more hopeful during the past week owing to renewed efforts on the part of the parties most interested in sustaining values to form a new pool; but whether the contemplated new combination will simply embrace the American producing companies, or also include the foreign holders of the stocks of copper warehoused in this country is not yet known, the pending negotiations not having reached the stage when this can be determined. In view of the unpleasant surprise which the producers in this country recently experienced through the underhand action of the foreign holders in putting large lots of their copper in the market at the very moment when it was expected that an agreement was about to be consummated, we venture to express the opinion that any attempt to come to a satisfactory understanding with them now is hardly likely to prove successful as the lesson that action taught our home producers must make them exceedingly distrustful of the foreigners in the future, and they are not likely to fall into such a trap again. We may remark here that it is now alleged that the recent heavy sales on the part of the foreign banking firm were effected without the knowledge or authority of the principals of the firm in question, and were brought about by some misunderstanding on the part of a high official connected with the house. We simply state this for what it is worth.

Business in our home market has been very quiet during the week, and the present quotations may be given as follows: Lake copper, 11c.; casting copper, 10c. Advices from Europe are not quite so encouraging as previously, and the markets on the other side have lately assumed a much quieter tone, with sellers more numerous. The fluctuations during the past week in the London market for Chili Bars and G. M. B.'s have been quite unimportant in character, and to-day's latest cable quotations are—Spot, £42 15s.@£43; and three months, £41 15s.@£42.

For refined sorts the latest London quotations are: Best Selected, £48@£49; English Tough, £47@£47 10s.; Strong Sheets, £56; India Sheets, £52 10s.@£53, and Yellow metal, 5⅝@5½d.

The exports of copper from New York during the last week were as follows:

To Liverpool—	Copper Matte.	Lbs.	
By S. S. Wisconsin	2,170 sacks	241,920	$10,800
" "	210 bbls.	224,433	10,000
" Rome	2,271 bags	248,618	11,100
" England	5,162 sacks.	543,280	24,700
To Liverpool—	Copper.		
By S. S. England	188 pigs	56,030	5 600
" Nevada	339 pigs	112,021	11,200
To Hamburg—	Copper.		
By S. S. Cambodia	518 pigs	101,725	11,500
" "	105 slabs	44,800	4,000
To Amsterdam—	Copper.		
By S. S. Adam	134 casks	168,000	18,690

Tin.—The unusually heavy premium which spot tin has lately commanded, in comparison with quotations for forward delivery, has been further modified to a considerable extent during the past week, owing to large arrivals from the other side; but these recent arrivals, together with those shortly expected, have apparently already been fully discounted; and as most of the tin is taken direct from dock for shipment to consumers, the prospects for the next two or three weeks are that if not actually insufficient to meet current requirements the supply of spot tin will at any rate be far from excessive, as the quantity in course of shipment from the other side is comparatively light. These conditions are consequently likely to keep the price of spot tin at a moderate premium for some little time to come until our stocks have had time to be replenished. The demand on the part of consumers continues very satisfactory, and of course they are not likely to hold much in stock in the present state of the market. Our closing quotations to-day are: Spot, 21. Oct., 20·30; Nov., 20·20; Dec. 20·20.

During the week the fluctuations in the London market have been moderate. Closing last Friday at £90 5s. to £90 7s. 6d. spot, and £90 10s. to £90 15s. three months. Prices improved a little in the early part of this week; and on Monday $90 12s. 6d. to £90 15s. for spot and £90 17s 6d. to £91 for futures was touched, but afterwards the tendency was toward gradually lower values, and the closing prices to-day are, spot $89 15s to $89 17s 6d. and three months £90 7s. 6d. to £90 10s., being a decline of about 10s. for the week.

Lead.—The lead market remains rather sensitive, with little disposition on the part of either consumers or speculators to operate. The least sign of a desire to purchase causes a rise in prices, and the quantity offering at current quotations is very limited. As a rule the smelters show no desire to sell at present prices, evidently looking for better values before long as the result of the exclusion of the greater part of the Mexican silver-lead ore supplies. There can be little doubt that, irrespective of what may be the result of the expected Treasury decision on the Mexican ore duty question, the present restriction of importations must eventually have the effect of enhancing prices. After closing last week with sales reported at 3⅞c., the market became a good deal stronger this week, and towards the end of it business was done as high as 3·95c. spot and 4c. for later deliveries.

The European markets are quiet, and the latest London quotations are English, £12 15s., Spanish, £12 12s. 6d.

The Chicago Market.—Messrs. Everett & Post telegraph us as follows to-day: Free offerings by one refiner have caused values to sag off somewhat in our market, and considerable lead has changed hands at 3·75c., but holders are asking 3 80c.

The St. Louis Market: Messrs. John Wahl & Co. telegraph us as follows: Market is gradually assuming a quieter aspect and the demand is not quite as good as last week; prices ranging from 3·72½c.@3·75c. for chemical, soft Missouri, and refined.

Antimony.—The great and increasing scarcity of this metal has led to a further advance in prices, and Hallett's cannot now be bought below 17½c., and Cookson's at 19@19¼. In England prices are nominal, and nothing in Hallett's can be secured below £67 for early shipment.

Spelter is without alteration since our last. Business is quiet and quotations remain at 5·15@5·20 for prime western.

The latest European advices are not quite so strong as they have been for some time past, and the latest quotations are: Ordinaries, £22 5s.@£22 10.; Specials, £22 10s.@£22 15s.; American Sheet Zinc, 6¼d.

Quicksilver.—The market continues quiet at £9 15s. in London, $49 per flask in New York and 66c. per lb. in a jobbing way.

Nickel.—Offerings are still limited. Wharton's price is 78c. per lb., nominally, but he claims to have none to offer, and so far as can be learned the only supply available is held at 85c. in casks. In a retail way, as high as $1.00 is asked. Advices from abroad report that there is no scarcity of ore on the other side; but the smelters have not been producing as much as usual, and a large part of the production has been purchased by the English government for the purpose of nickel coating its shells. Exportations have consequently been very light. The American market, in fact, has received an incredably small amount as compared with former years.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, September 27.

Pig Iron.—The market for crude iron continues rather quiet, but nevertheless firm. Furnaces, both North and South, are busy delivering all the iron they make on orders that have been booked for some time, and on new business they are disposed to ask a slight advance in price. This feeling has naturally been strengthened by the indications of a generally increasing consumption, particularly in the West, from whence reports of very active markets are constantly being received. On the other hand, many consumers have supplied their wants for the present and for the immediate future, and feeling no pressing need of iron, they show no signs of anxiety as to prices, and refrain from action likely to provoke an advance on the part of holders. Present indications therefore are for a continuance of firm prices, but the knowledge that many idle furnaces would probably start up on the first signs of a "boom" seems likely to prevent any considerable increase in selling prices.

Ruling quotations continue as follows: Standard Northern brands, No. 1 Anthracite Foundry, $17@$18; No. 2, $16@$17; Gray Forge, $15@$15.50. Southern brands, No. 1 Coke Foundry, $16.50@$17; No. 2 $15.50@$16, and $15 for Gray Forge.

The agents of the Tennessee Coal, Iron and Railroad Company inform us that their company is practically out of the market for all grades except No 1 Foundry and No. 1 Soft, which are quoted at $17 and $16.50 respectively.

Scotch Pig.—The Glasgow market continues unusually active, and prices have further advanced. Quotations have, of necessity, risen here, but the state of this market is far from being a reflection of the condition of the trade abroad Sales have been light. For Langloan, $24 is asked, and Shotts is held at $23@23 50. Other brands are nominally former, but unchanged.

Spiegeleisen and Ferro-Manganese.—In this line of material something akin to a boom is taking place. Ferro manganese, 80 per cent., has advanced to $73@$75, and at the close the latter figure may be said to represent the market. A month or so ago, when ferro-manganese was obtainable at much lower prices, buyers were apathetic; now apparently they all want it, and as offerings are light, prices have been quickly and easily advanced and the tendency is still upward. In consequence of the limited offerings, sales have been restricted. On Wednesday 200 tons were sold at private contract, and yesterday a lot of 100 tons changed hands, it is said, at the highest figure yet named, $75. To-day 200 tons were sold at a slight concession from this figure; but as this was an offer made some days ago, no weakness is indicated. For spiegeleisen, 20 per cent., $32@$33 is now quoted. There is very little to be had.

Steel Rails.—The market for rails is uniformly firmer. All of the Eastern mills are now adhering to the $29 quotation at mill and in at least one instance as high as $30 has been paid. At Pittsburg the inside quotation is $31. Business during the week has been active, one Eastern mill claiming to have closed contracts for 23,000 tons at $29@$30. Another has sold 10,000 tons at $29, and has an inquiry pending for 10,000 tons for Southern delivery at $29 at mill, which will probably be closed to-day. Other sales of less importance, aggregating about 3,000 tons, have also been made. In the West, we understand that the Union Pacific has placed an order for 40,000 tons in Chicago, where as high as $33 has been quoted. For orders payable in cash and stock or bonds, an advance in price is insisted upon. We learn of one inquiry of this sort payable in six months' time with interest which is being figured on the basis of $31 at mill. The continued firmness of pig iron, the advance in spiegel, and the liberal orders that have been booked, have stiffened the views of sellers, and the tone of the market is improved.

Structural Iron and Steel.—The recent storms have somewhat delayed out-door work, but the inquiry for structural work contines good. A number of the mills are figuring on some of the big work in this city to which we have referred in previous issues.

Steel plates are also firmer and sales are recorded at advanced prices. We quote as follows, at mill: Bridge plate, 2·1c.; angles, 2·15@2 25c.; tees, 2·5@2 6c.; steel angles, 2·35c.; beams and channels, on wharf, 2·8c.

Steel plates are held as follows: Tank and Ship, 2·25@2 5; Shell, 2·6; Flange, 2·85; Fire-Box, 3·50@4.

Iron Plates are quoted as follows on wharf: Common tank, 2·25c.; refined, 2·3@2·4c; shell, 2·4@2·5c.; flange, 3·5@3·7c.; extra flange, 3¾@4c.

Bar Iron at mill is quoted at 1·6c. for common, and 1·7c. for refined. Deliveries from store are quoted as follows: Common, 1·9c. base; Refined, 2c. base; "Ulster," 3@3·1c. base; "Norway," 5c. Shapes, and Norway nail rods, 5c.

Merchant Steel.—The advance noted last week has been generally maintained on all grades of open hearth steel. Tire steel has now advanced to 2½c., and toe-calk is held at the same figure. We quote: Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾.; open hearth machinery, 2·3c.; open hearth spring, 2½c.; tire steel, 2½c.

Rail Fastenings.—Moderate sales at firm prices are reported. For spikes 2 cents is asked, and angle fish-plates are quoted at 1·90c. Bolts and square nuts are quoted at 2·9@3c.; bolts and hex. nuts are quoted at 3c.

Pipes and Tubes.—The revised schedule of list prices of wrought iron pipe in accordance with the changes made at last week's meeting of the association in Pittsburg, which has just been published, gives the following prices: Butt Welded: black, from 4 cents per foot for ⅛ inch inside diameter to 14 cents for 1¾ inches; galvanized, from 5 cents to 18½ cents for the same dimensions. Lap Welded: black, from 23 cents for 1¼ inches to $11 for 15 inches; galvanized, from 26 cents for 1¼ inches to $2 for 6 inches. Butt Welded: X Strong, from 8 cents for ⅛ inch to 28 cents for 1¼ inches; XX strong, from 22 cents for ½ inch to 56 cents for 1¼ inches.

Lap-welded X strong, from 46c. for ⅜-inch to $3.30 for 6-inch.; XX strong, from 92c. for 1½-inch to $6.60 for 6-inch.

Tarred or asphalted butt-welded, from 4½c. for ¼-inch to 16½c. for 1¼-inch. Tarred or asphalted lap-welded, from 28c. for 1⅛-inch to $2 for 6-inch. Rates of discount on wrought-iron pipe remain as follows: Butt welded, plain and tarred, 50 per cent. discount; galvanized, 42½ per cent. discount; lap-welded, plain and tarred, 62½ per cent. discount; galvanized, 50 per cent. discount. A discount of 57½ per cent. is allowed on boiler tubes of 2 inches and larger, and 52½ per cent. on 1¾ inches and smaller.

Cast-iron pipe remains at $25.50@$30, according to size.

Old Material.—Buyers to some extent have been forced into the market for old rails and a number of sales have been made. One importer claims to have sold from 2,000 to 3,000 old tees at $25, to be delivered here and in Philadelphia. This is the lowest quotation we have been able to obtain for any of the rails in store. We quote $24@$25. Wrought scrap No. 1 is held at $21 on board cars at Jersey City.

Pig Iron on the Stock Exchange.—The Committee on Unlisted Securities of the Stock Exchange have adopted the following rules governing the sale of pig iron warrants, to the listing of which we referred in our last issue:

SECTION 1.—The warrants shall be the issue of the American Pig Iron Storage Warrant Company. Each warrant shall be for 100 tons of pig iron, and but one brand of iron and one grade of iron shall be covered by the same warrant.

SEC. 2.—All bids and offers shall be for lots of 100 tons.

SEC. 3.—All sales of, or contracts for, warrants, (unless otherwise specified—see Sec. 6), shall be understood to be for No. 2 Foundry Iron (or its equivalent, as provided in Sec. 4), of a brand recorded by the exchange as a good, merchantable brand, delivered in New York (or its equivalent, as provided in Sec. 5).

SEC. 4.—Any grade of iron whose relative difference in value, as compared with No. 2 Foundry, which has been recorded by the Exchange, may be delivered on contracts (in which a special grade is not specified), at such difference in price as stands recorded by the Exchange at the time of delivery.

SEC. 5.—The equivalent of New York delivery shall be by warrants for iron stored in any warrant yard of the American Pig Iron Storage Warrant Company, less the rate of freight recorded by the Exchange as current from said yard to New York.

SEC. 6.—Sales of, or contracts for, warrants covering a special brand, or a specified grade, or special place of delivery, may be made, in which case only a warrant for the brand, grade and delivery named can be delivered on such sales.

SEC. 7. A storage charge of two cents per ton per month, or fraction of a month, to run from the first of the month following the date of the warrant, will be payable at the time of its surrender. The accrued storage on warrants shall be deducted from the price in the same manner as the freight, at the time of delivery of the warrant.

SEC 8. There shall be kept by the Exchange:

1. A record of such brands as are considered good, merchantable brands.

2. A record of the official difference in value fixed by the Exchange between No. 2 Foundry and other grades that are deliverable.

3. A record of the rates of freight from different warrant yards to New York.

The following "Warrant Bulletin" has also been issued.

Each warrant must be:

1. For 100 tons pig iron.
2. For a good merchantable brand.
3. For No. 2 Foundry, or its eqivalent.
4. New York delivery, or its equivalent.

EQUIVALENT OF NO. 2 FOUNDRY.

No. 1 Foundry is deliverable at 50c. per ton above No. 2. Foundry.

No. 3 Foundry is deliverable at 50c. per ton below No. 2 Foundry.

Grey Forge is deliverable at $1 per ton below No. 2 Foundry.

Good, merchantable brands.	Location of yards.	Reduction from N. Y. price to make equiv. to N. Y. delivery. Per ton.
Sloss	Birmingham, Ala.	$3.75
Mary Pratt	" "	3.75
Williamson	" "	3.75
Alice	" "	3.75
Trussville	" "	3.75
De Bardeleben	Bessemer, Ala.	3.75
Ensley	Ensley City, Ala.	3.75
Ivanhoe	Ivanhoe, V.	3.05
Woodstock	Anniston, Ala.	3.86
Lady Ensley	Sheffield, Aba.	3.96
Citico	Chattanooga, Tenn.	3.75
Eureka	Oxmoor, Ala.	3.75
Woodward	Wheeling, Ala.	3.75
Crane	Catasaqua, Penn.	.70
Cameron	Emporium, Penn.	2.60

Louisville. Sept. 25.

(Special report by Hall Brothers & Co.)

A larger volume of business is reported for the week past. Inquiries have been good, and although applications were usually made for moderate-sized quantities, they developed into round lots in the course of the negotiations, and in some cases they have been closed for double the quanuty inquired for. High quality car-wheel iron shared a liberal portion of the week's business, sales being made in thousand-ton lots. Transactions in coke irons have varied in prices according to the temper of the seller.

Prices f. o. b. cars Louisville are as follows:

Hot Blast Foundry Irons.		
Southern Coke No. 1		$14.75@$15.25.
" " No. 2		14.00@ 14.50.
" " No. 3		13.75@ 14 25.
Mahoning Valley, Lake ore mixture		17.50@ 18.00.
Southern Charcoal No. 1		16.50@ 17.00.
" " No. 2		16.00@ 16.50.
Missouri " No. 1		17.50@ 18.00.
" " No. 2		17.00@ 17.50.
Forge Irons.		
Neutral Coke No. 1		13.25@ 13.75.
Cold Short		13.00@ 13.25.
Mottled		12.50@ 13.00.
Car Wheel and Malleable Irons.		
Southern (standard brands)		22.00@ 22.50
" (other brands)		17.50@ 18.00
Lake Superior		22.00@ 22.50

Pittsburg. Sept. 26.

[From our Special Correspondent.]

Raw Iron.—Trade in raw iron has been active, the volume of business large Sales in many instances show a further advance; in fact, it is very evident that brokers and furnace men have things all their own way. In leading descriptions a firmer tone is perceptible; the supply of desirable brands is not large, spot iron being difficult to obtain, and unless there is a falling off in the demand, which from present indications is a long way off, we may look for a higher range of prices. The party that sent a report to a New York paper that there were several brokers in town that were willing to sell Bessemer all this year at $18 per ton was slightly off for his information. We report sales 2,000 tons Bessemer, at the furnace, $18.40 cash. There were a number of sales made at about $18, which will be found under the proper head. Formerly Eastern prices ruled above Western; at the present time certain descriptions are higher in Pittsburg than the East.

Consumption continues very large; most of the mills are running double time, having all the orders booked they want. A leading mill man remarked "Last month's business was the largest we ever had and we were running double turn." The outlook just now is all that could be desired. The supply of low-priced iron, however, is pretty well exhausted. During the week several furnace men from the Mahoning and Shenango Valleys were in town and found no difficulty in disposing of all the iron they had for sale at good prices.

In former times a moderate advance in the American market would induce heavy shipments from Great Britain. Things have changed. They have use at home for all the iron they can make. The advance on pig iron, as compared with one year ago, is 16s., or $4 per ton, and other descriptions in equal proportion. In fact, certain kinds of iron rule as high in the English market as our own, hence there is no fear of our neighbor across the waters.

Ferro-manganese and spiegel have advanced several dollars per ton. Bessemer is higher. Most descriptions of steel show higher figures. The following sales tell the story:

Sales.

Coal and Coke Smelted Lake Ore.	
3,000 Tons Bessemer Spot	18.25 cash.
3,000 Tons Bessemer	18.15 cash.
2,000 Tons Gray Forge, at furnace	15.75 cash.
1,500 Tons Gray Forge	15.80 cash.
1,500 Tons Bessemer	18.50 cash.
1,200 Tons Gray Forge	15.80 cash.
1,000 Tons Bessemer, high silicon	19.00 cash.
1,000 Tons Bessemer	18.30 cash.
500 Tons Gray Forge	15.85 cash.
500 Tons Gray Forge	15.65 cash.
500 Tons Gray Forge	15.75 cash.
500 Tons Gray Forge	15.80 cash.
500 Tons Gray Forge	16.00 cash.
500 Tons White Bessemer	16.75 cash.
100 Tons No. 1 Foundry	17.50 cash.
100 Tons No. 2 Foundry	16.50 cash.
1,200 Tons Southern Gray Forge	15.50 cash.
Coke, Native Ore.	
500 Tons Gray Forge	15.85 cash.
500 Tons Gray Forge	15.50 cash.
400 Tons White Iron	14.50 cash.
50 Tons Silvery, extra	19.00 cash.
50 Tons Silvery	16.40 cash.
Charcoal.	
150 Tons Cold Blast	27.75 cash.
125 Tons Cold Blast	27.75 cash.
50 Tons No. 2 Foundry	22.50 cash.
50 Tons Cold Blast	25.00 cash..
Muck Bar.	
1,000 Tons Neutral	28.50 cash.
1,000 Tons Neutral	28.50 cash.
1,000 Tons Special	29.00 cash.
1,000 Tons Neutral	28.75 cash.
Steel Wire Rods.	
500 Tons American Fives	44.00 cash.
Steel Bloom Ends.	
500 Tons Bloom Ends	21.00 cash.
Ferro-Manganese.	
200 Tons, 80 per cent	72.40 cash.
100 Tons, 80 per cent	77.40 cash.
Spiegel.	
250 Tons 10 and 12 per cent	35.00 cash.
100 Tons, 20 per cent	40.20 cash.
80 Tons, 20 per cent	40.00 cash.
Steel Slabs and Billets.	
800 Tons Nail Slabs (Wheeling)	30.25 cash.
500 Tons, Bloom	32.00 cash.
500 Tons Billets	32.00 cash.
500 Tons Billets	31.50 cash.
Skelp Iron.	
700 Tons Sheared, per 100 lbs	2.25 4 mo.
300 Tons Narrow Grooved, per 100 lbs	1.80 4 mo.
275 Tons Wide Grooved, per 100 lbs	1.90 4 mo.
Old Iron Rails.	
1,000 Tons American Ts	27.00 cash.
1,000 Tons "	26.50 cash.

Prices.

Coke or Bituminous Pig—		Muck-Bar	28.50@29.00
Foundry No. 1	$17.25@17.50	Steel Blooms	31.00@32.00
Foundry No. 2	16.25@16.50	Steel Slabs	30.00@31.00
Gray F. No. 3	15.75@16.00	Steel Cr'p Ends	20.00@21.00
" No. 4	15.25@15.35	Steel Bl. Ends	21.00@21.50
White	14.50@14.75	Ferro-Man., 80%	76.00@77.40
Mottled	14.50@14.75	Steel Billets	31.00@32.00
Silvery	16.50@19.00	Old Iron Rails	26.50@27.00
Bessemer	18.25@18.50	Old Steel Rails	18.00@20.00
Low Phos	21.50@22.00	No. 1 W. Scrap	19.00@19.50
Charcoal Pig—		No. 2 W. Scrap	17.50@18.00
Foundry No. 1	23.50@24.50	Steel Rails	@31.00
Foundry No. 2	22.00@22.25	" light sec	31.00@34.00
Cold-Blast	25.00@28.00	Bar Iron, nom	1.75@ 1.85
Warm-Blast	24.00@25.00	Iron Nails	@ 1.90
10 + 12% Speigel	35.00@35.50	Steel Nails	@ 1.90
20% Speigel	@40.00	Wire Nails	2.15@ 2.20

Philadelphia. Sept. 27.

(From our Special Correspondent.)

Pig Iron.—Every indication in the market points to strong prices during October. Since Monday, brokers handling standard brands of forge have received inquiries for between twenty and thirty thousand tons, but have sold very little. Buyers especially in large lots are anticipating a little shading on off brands, and will probably be accommodated. On choice brands, the market is as strong as it has been since midsummer, but the inferior brands have lost some of their strength, and cannot be sold in large lots at present outside quoted prices. Two very opposing views are entertained in the iron trade, with reference to crude iron; one is, that before the opening of winter standard irons, both foundry and forge, for early delivery, will be 50 cents higher; the other is, that none but choice brands will be able to hold their strength, and that so far as large buyers are concerned, there will be a shading. As to foundry irons, very little has been bought, but the consumption is heavy, and buyers will be obliged to come in soon and cover. Nearly all first-class brands of No. 2 are held at $16.50@$17, and No. 1 is $17.50@$18. Forge quotations range from $15@$15.75. Makers are not endeavoring to unload large stocks on the market.

Blooms.—The outside quotations have been paid for all slabs and blooms contracted for. There is rather more inquiry this week for nail slabs, and some large orders are promised between now and Saturday. Quotations are $31@$32 for nail slabs, $32 for tank, $37 for shell, $40 for flange. Charcoal blooms are held very firmly at $53; anthracite, $43, and scrap, $33, with fluctuations of about 50 cents.

Muck Bars.—The business for the week has been light, and no actual change in quotations is to be reported.

Merchant Iron.—Large buyers are doing nothing more than keeping a close watch on the market, and are ready to take advantage of any weakness that may crop out. While makers are always anxious to secure orders for merchant bars, there are no instances known this week of concessions from current quotations. There is too much business on hand, and assured, to allow any weakness to manifest itself. Some orders have been placed this week for January delivery, which is rather far ahead. Common iron is selling well at several interior mills that have managed to secure some car-building orders. Refined is 1·90; medium, 1·80; and common, 1·70.

Nails.—The demand for nails has fallen off, but prices are held, especially for standard makes, at $1.90 for car-load lots. Buyers who were offered concessions two or three weeks ago recently concluded to accept, but found that the views of makers had changed in the meantime. Store lots are firm at $2.

Skelp Iron.—Skelp iron is dull, in the sense that the heavy consumers have stocks enough under contract to see them through a good deal of business on hand; but it is not dull in the sense that there is more being made than there is a market for; the mills are over sold. Buyers are offering 1·80 for grooved.

Plate and Tank Iron.—The larger buyers of plate and tank have temporarily disappeared from the market; but there is no weakness, and not likely to be any. Purchasers who have large operations in hand, and who have been obliged to pay the outside quotations, seem to be holding back, under the idea that

some manufacturers will soon be out of orders and that a cutting of prices will follow. While there is always a possibility of this, it seems, from all that can be gathered, that the mills are too far oversold to warrant any expectation of a decline. Ordinary plate is still quoted away up at 2 20, and universal plate at 2 30; shell, 2 60, and flange, 3·25; steel plate is strong at 2 30, and is quoted as high as 2 40. All of the manufacturers are counting upon slightly higher winter prices to cover the increased winter cost.

Sheet Iron.—The reports from all the sheet-iron makers and sellers are that business is good and prices strong.

Wrought-Iron Pipe.—The demand for boiler tubes is very heavy; all establishments using them are crowded with work. More or less business is coming to hand for wrought-iron pipe, and the outside market quotations represent the average selling price.

Structural Iron.—To day quotations were made to large buyers of bridge plate at 2·25 delivered. Angles are 2 20; tees, 2 60; beams and channels, 2 80. The threatened advance has taken place, so far as small buyers are concerned; but there are four or five operations in hand, in which the purchasing interests are negotiating for better terms than the public quotations.

Steel Rails.—Three or four large steel rail orders would send market quotations up a dollar. Makers are extremely anxious to quote $29@$30 as their bottom figures to large buyers, and are making strong efforts to obtain those figures. Two or three Southern roads have placed orders for large lots, but the bulk of the business admitted at the offices here consists for the most part of small lots of heavy rails. Brokers who have been representing small buyers report views among rail makers much stronger, and the brokers themselves admit that prices have an upward tendency.

Old Rails.—It is almost impossible to gather up any valuable information regarding old rails. Lots are offered at $25@$25 50 delivered.

Scrap Iron.—There are a great many orders in hand for scrap which cannot be filled. The dealers some time ago accepted orders at fixed figures, and find it rather difficult to execute them. Cargo lots are $21.50; car lots, $22.50; choice, $23.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Sept. 27.

Heavy Chemicals.—The most notable feature of the market this week has been the continued advance in caustic soda, for which $2 32½ to $2.37½ is now asked. These quotations will apply to both 70 and 74 per cent. For 60 per cent. $2.50 to $2 55 is quoted. Advices from Liverpool report that consumption there has been excellent, owing to the demand for Russia and Continental ports before the close of the Baltic. In New York the supply of spot has been disposed of, and very little in this position is now obtainable.

Bleaching powder continues weak; about $1.72½ to $1.75 is now quoted. The demand is light, and unless the combination of English makers is shortly formed the outlook for the future is not at all encouraging.

There has been more inquiry for carbonated soda ash, 48 per cent., for glass-making purposes. The usual quotation is $1.25.

Caustic soda ash is in light demand, and prices vary from $1.17½ to $1.25, according to quantity and brand. Sal Soda is stationary at 95c. for English brand, and 90c. for American. Refined Alkali is firm and in good demand.

Owing to the increased consumption both at home and abroad the local market has been well sustained since the first of August, despite the failure to form the combination on the other side, but, as we have previously noted, the collapse of the combination scheme means a total change in the underlying conditions of the trade. When consumption begins to fall off in the absence of any combination, competition must again be severely felt, and unless there is some uniform agreement on prices, it seems probable that the struggle for the survival of the fittest will continue and low prices will be inevitable. As will be seen by reference to our Liverpool letter this week, the situation of the Leblanc process makers is regarded as very serious. Excessive competition together with the increased cost of raw material, coal, salt and lime stone, it is feared, will force the weaker members of the trade to succumb. When this contest will be inaugurated depends simply upon the future relative positions of supply and demand.

It is gratifying to find the views expressed in the ENGINEERING AND MINING JOURNAL of last week and the week previous confirmed so exactly by well-known authorities in the producing district, as the following would indicate:

The Leblanc alkali trade.—We are sorry to learn, says the *Chemical Trade Journal*, that the negotiations for reducing the decomposition of salt have come to an untimely end. Nearly all the manufacturers met in Liverpool on Wednesday (September 14th) expecting to confirm the proposal which had previously met with such general acceptance, but to their dismay it was announced that one large manufacturer, upon whose decision several others depended, had intimated his intention of withdrawing from this or any other similar combination of the trade. Therefore the proposed association dissolved itself into solemn silence. Certainly the altered prospects give the trade ample room for thought. The Bleach Association will most probably cease to exist at the end of this year, and what then? We hesitate to intensify the gloom, for the outlook is dark enough already. The rich can wait, and the poor must watch for the good time coming when all the hydrochloric acid of the salt decomposed can be converted into chlorine at a profit. It can be done, and it must be done, and England should do it. The Leblanc soda trade is practically *aux abois* unless the manufacture of caustic soda be vastly improved, and there is room for improvement, but as an auxiliary in the manufacture of chlorine, it is still paramount and may yet rise by stepping stones to higher things. Chlorine of magnesia will have to be reckoned with in the near future, but with the best possible chemical skill. Stassfurt cannot do more than compete at a disadvantage for the German trade, and natural advantages we possess in chloride of sodium and cheap fuel should be more than sufficient means of safety. Having lost his crutch the lame man must try and walk without it, and now that the Leblanc alkali manufacturers have abolished protection and adopted free trade, they must sink or swim by individual effort. The lesson for to-day is every man for himself and sauve qui peut."

Acids.—Whatever may be the ultimate success of the combination of acid manufacturers, there is no doubt that so far since its organization it has been remarkably fortunate in having been strengthened by a notable increase in consumption. For once the natural laws of supply and demand, those arbitrary powers which usually resent all attempts at interference, seem to have conspired to put a "combine" on its feet. It is noteworthy that since early summer, the date of the promulgation of the manufacturers' "agreement," business has been unusually brisk. We hardly believe the increased activity is to be attributed solely to the formation of the combination, but, inasmuch as these occurrences have been coincident, the credit for the former will, perhaps, naturally be given to the latter, and thus there is now more confidence in the efficiency of a "combine" than would have probably been the case had the "agreement" been made and put into effect during extreme depression.

By all this we do not mean to disparage the benefits that have accrued from the action that has been taken; but we wish to call attention to the fact that the working of the present "agreement" has been under remarkably fortuitous circumstances, and no one should think on account of the present satisfactory condition of the trade that what has been accomplished will be sufficient to preserve a similar state of affairs under the varying conditions of demand and supply. In other words, a more permanent form of organization is needed.

We had supposed until this week that this was generally realized, and that the adoption of a more definite plan was only a matter of time; but it now appears that all are not agreed on the subject. Various pooling arrangements and similar schemes have been suggested, but as yet it has been impossible to reconcile all the conflicting ideas. We suspect that in a measure the difficulty is simply owing to a revival of the old division between the large and the small makers, a division which in recent years has been the cause of much antagonism and many a contest. It is unnecessary at present to go into any of the points at issue. It may be said, however, that no differences of a serious nature have yet arisen; there is no lack of harmony at any of the meetings, and on the subject of prices the trade continues to present an unbroken front.

Fertilizing Chemicals.—There has been a more active market of fertilizing material this week, although ammoniates generally continue weak in consequence of the effort that is being made in certain quarters to "bear" the market. The most apparent weakness has been in dried blood. City blood has been quoted as low as $2 per unit, but a fairer quotation is $2.10. Western high grade has weakened a little, but not so much as the Eastern product. Sales of Western high grade have been made at $2.25. Azotine is also apparently weaker; how much so it is difficult to learn. From $2 10@$2.15 are the quotations reported, but we believe that the latter figure is the nearest to the actual price. In sympathy with ammoniacal material, tankage is also weaker. For high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $22 is quoted, and for low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $21 is asked. So far as can be learned, the weakness in all of this class of material is due only to temporary causes, and it is believed that values will regain their normal basis. Other articles are not quotably changed. Fish scrap, $22 per ton, f.o.b. factory. Sulphate of ammonia at $3@$3 05 per cwt. Concentrated tankage, $2.15. Refuse bone-black, guaranteed 70 per cent. phosphate, $20@$20 50 per ton. Dissolved bone-black is 92½c.@$1 per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20 @$23.50; ground, $26@$27.

Charleston rock, undried, $5.50@$5 75 per ton; kiln dried, $6.75 @$7 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, $11, ex-steamer at New York.

Our special correspondent at Charleston, Mr. Paul C. Trenholm, sends us the following statement of the shipments and consumption of phosphate rock from and at Charleston and Beaufort, S. C., from September 1st, 1887, to August 31st, 1889:

	1887-88. Crude.	1887-88. Gr'nd.	1888-89. Cr'de.	1888-89. Gr'nd.
Coastwise from Charleston	154,664	5,430	162,562	3,550
By railroads from Charleston	35,586	.....	46,265	.....
Foreign from Charleston	3,650	.....	5,871	.....
Consumed at Charlest'n, est'd	60,000	.....	80,000	.....
Coastwise from Beaufort	10,844	.....	66,520	.....
Foreign from Beaufort	159,891	.....	127,940	.....
Consumed at Be'uf'rt, est'm'd	13,000	.....	15,000	.....
	437,635	5,430	504,158	3,550

Muriate of Potash.—There have been some heavy arrivals during the week, some of which it is claimed, have gone into consumption, but it is believed that a good part of the receipts have been added to the previous accumulation. The syndicate's contracts preclude a weakness of price for this article, but the market is, nevertheless, depressed by the excess of the supply over the demand. We continue to quote the official price, $1.80 per 100 pounds.

Double Manure Salts.—This week there has not been much business in either grade of manure salt. For 48 per cent. spot lots $1.20 is quoted. Orders for future delivery can be placed at $1.15. High grade manure salt, basis 90 per cent. potash, is quoted at $2.32½ on the spot, in which position it is estimated there are about 200 tons. For futures $2.50 is asked, but at this altogether disproportionate figure few buyers are willing to contract. To increase the sales of this high grade article, which at the best has only a limited consumption, the German syndicate must lower its price, and as the syndicate at present seems to be more interested in the sale of other articles which it controls, there appears to be little probability that such action will be taken.

Kainit has probably been the most active of the potashes this week. One of the sales agents of the syndicate in this city informs us that two cargoes for future delivery have been contracted for during the week, and the small accumulation on the spot to which we referred last week has been disposed of. We continue to quote the official price, $10 per ton actual weight, and $9.75 foreign invoice weight.

Miscellaneous.—Arrivals of brimstone have been heavy this week, and the market is therefore rather weaker. For seconds, $19.50 is quoted, and thirds are offered at $19. This week's arrivals aggregate about 5,000 tons of Sicilian and 3,000 tons of Japanese.

Nitrate of soda has been fairly active at $1.90.

NOTES OF THE WEEK

Manurial Value of Different Phosphates.—An Italian Agricultural Experiment Station makes the following report: Maize was grown on a sandy calcareous clay soil without manure, with bone-meal alone, with bone-meal and ammonium sulphate, with bone-meal ammonium sulphate and potassium chloride; a similar series of plots being arranged with mineral phosphate in place of bone-meal. The experiments were made in duplicate or even triplicate, and the mineral phosphate was found to be nearly as good as the bone-meal when similar proportions of each were used. The best result was obtained with a dressing of 300 kilos. of bone-meal and 160 kilos. of ammonium sulphate per hectare.

Articles of incorporation have been filed for a large chemical manufactory at Woodbridge, N. J. It will be known as the Liebig Manufacturing Company, and will have a capital of $100,000. The principal stockholders are Gustav Liebig and John F. Gibbons, of Baltimore; and Paul Babcock, of Montclair. The offices will be in Newark.

Liverpool. Sept. 18.

(Special report by Messrs. J. P. Brunner & Co.)

Chemicals.—There is not much change in spot price of chemicals since our last. Soda ash quiet, prices unaltered. Caustic ash, 48 per cent. 1⅛ l. to 1 1/16 d.; high test, 3½d. to 1 1/16 d. Carb. ash, 48 per cent., 3½ d. to 1 1/16 d.; high test, 4½d. to 1 1/16 d. Soda crystals in good demand, £2 12s. 6d. lowest price. Caustic soda, in consequence of resales, is quiet on the spot; good demand for forward delivery. 60 per cent. scarce at £6 2s. 6d. to £6 5s.; 70 per cent. £7 2s. 6d. to £7 5s.; 74 per cent. in good demand, £8 lowest; 76 per cent. £8 15s. to £9. Bleaching powder quiet, nominal price £6 17s 6d. to £7. Chlorate of potash, demand improved 4⅝d. to 4½d. Bicarb. soda in good demand at £4 15s lowest quotation for one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia is quiet; £12 to £12 5s. for good gray 24 per cent. f.o.b. Liverpool.

Sales for next year of bleaching powder have been made for the home trade at a serious decline, owing, no doubt, to the failure of attempted combination, and £5 10s. at makers' works has been accepted for all 1890. At the close, however, price asked is about 5s. above this. No sales reported in hardwood; price about £6 5s. to £6 10s. f.o.b. Liverpool. The serious advances threatened in salt, fuel and limestone will affect the cost of production of chemicals very seriously for next year, and many makers are at present unwilling to commit themselves. The outlook for the old style of manufacturers is very serious.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Sept. 27.

Brick.—The clear weather of the last few days of the past week and early this week gave manufacturers an opportunity to make up for lost time in the matter of production, and consequently considerable brick has arrived since our last report, which has all been worked off, however, without any serious weakening of prices on account of the rather independent attitude maintained by sellers, who, in view of the approaching close of the season and the decreased production of the last few days owing to the rainy weather, are not at all anxious to push sales or to deplete the stocks at the yards. It is generally believed that the season for making brick will close earlier than usual and makers wish to carry forward sufficient brick to last them until the demand for building material ceases.

The main topic of conversation in the market during the week has been the proposed "trust." A well-known

manufacturer informs us that two "promotors of trusts" are endeavoring to organize such a combination among the Hudson River and New Jersey brick manufacturers. Several meetings for the purpose of interesting makers in this scheme have been held, but as yet little real progress has been made. The sentiment of the trade seems to be antagonistic to any such proposition and it is believed that it will be difficult to induce many manufacturers to assent to it. There are about 250 brick producers along the Hudson, Raritan, South and Hackensack rivers and at Key Port, N. J. All of these would have to be included in such a combination and even then it would probably be difficult to stifle all competition. It is true that the producing district has been pretty well explored for clay, but nevertheless the formation of a "combine" and the consequent advance in price would so stimulate production that only the most careful and judicious management would enable the combine to withstand the attacks of outsiders. There was an organization of manufacturers about twenty years ago called the North River Brick Association, which worked well for a while but finally collapsed, and there is also at present an organization called the New York and New Jersey Brick Manufacturers' Association, which, however, has had little effect on trade or prices. It must be admitted that the depression of the past few years has caused a great deal of complaint and in many cases selling prices have left a very scant margin over the cost of production, but nevertheless it is not believed that the trade is quite ready as yet to enter into such a scheme as is talked of.

Prices remain about as quoted last week, possibly a little stiffer. For top quality Haverstraws, $6 to $6.25 is quoted. Up Rivers are held at about $5.50; Jerseys at $4.50 to $5, and Pale from $3.25 to $3.75.

Stone.—On the whole this has been a fairly prosperous time in the stone trade. Most of the big orders for this year's work have now been placed. The quarries are busily engaged on contracts, and will continue to be so for some weeks to come. Perhaps the most marked feature of the trade this year has been the decreased consumption of brown stone, and it is said that at least three of the four Connecticut quarries have found this rather an "off" year. They claim, however, that the decreased sales of brown stone in New York have been compensated for by new business in outside markets. The favorite stone this year has been limestone, but in fact all of the newer stones have had a liberal trial. Euclid stone has not turned out as well as was expected. As was noted in the ENGINEERING AND MINING JOURNAL in the early part of the year, this stone is permeated with oil, and is consequently liable to discoloration and early decay. Scotch red stone has been largely used and apparently with success. Granite is a formidable competitor to all of the other stones. It is believed that the consumption of Maine gray granite this year has been larger than usual. Not so much attention has been paid to the Scotch red granite, and it is consequently offered in this market at a relatively lower price than its American rival. There are those who claim that ultimately brown stone will return to favor. It is said that much of its failure to please has been due to careless laying, and that when some of the newer stones have had a thorough trial, it will be found that brown stone is their superior, both in appearance and durability. Brown stone, they say, when laid "on its natural bed," is not so liable to decay or crumble as many other stones.

Most of the building done this year has been large work. There are several important enterprises that will require a large amount of stone, which are now engaging the attention of the trade. Among these we may mention Andrew Carnegie's new music hall on Sevenue and Fifty-seventh street, the new Madison square building and the new building of the Jersey Central Railway, on West street. Stone has also been recently ordered for the new *World* building.

Lime.—The market for this material is unchanged. Arrivals are regulated to meet the demand, and association prices are easily obtained.

CONTENTS.

	PAGE.
Howe's Metallurgy of Steel	263
Tellurium	263
Leadville Ore Production	263
President Diaz' Message to the Mexican Congress	263
George H. Cook	263
The Cost and Profits of Irrigation	264
Excavating by Hydraulic Power	264
Steam Engine Design	265
Notes on the Treatment of Gold Ores	265
The Metallurgy of Silver	265
Value of the Machinery and Supply Column	266
Gypsum	266
The Mexican Ore Question	266
*Brush Electric Hoist	267
Progress of Metallurgical Science in the West	268
Electricity in Place of Sand	269
*The Hazelton Boiler	269
*Tamarack Mining Company's Report	270
Books Received	271
Patents Granted	271
Personals, Obituary, Industrial Notes	272
Contracting Notes	272
Machinery and Supplies Wanted at Home and Abroad	272

*Illustrated

MINING NEWS:	
California	273
Colorado	273
Dakota	274
Idaho	274
Illinois	274
Indiana	274
Michigan	274
Montana	274
Nevada	274
Pennsylvania	274
Utah	275
Virginia	275
FOREIGN MINING NEWS:	
Central America	275
Mexico	275
ORE MARKET	275
MEETINGS	275
DIVIDENDS	275
ASSESSMENTS	275
MINING STOCK MARKETS:	
New York	275
Boston	276
St. Louis	276
Coebic Stocks	276
Electric Stocks	276
Auction Sale of Stocks	276
Pipe Line Certificates	277
MINING STOCK TABLES:	
Baltimore	284
Birmingham	284
Boston	283
Coal Stocks	283
Denver	284
Kansas City	284
London	284
New York	283
Paris	284
Pittsburg	284
San Francisco	283
St. Louis	284
Electric Stocks	284
Trust Stocks	284
MARKETS:	
COAL: New York	277
Boston	277
Buffalo	277
Pittsburg	277
FREIGHTS	278
METALS	278
IRON: New York	278
Louisville	279
Pittsburg	279
Philadelphia	279
IMPORTS AND EXPORTS OF METALS	281
CHEMICALS AND MINERALS	280
BUILDING MATERIALS	280
CURRENT PRICES:	
Chemicals	284
Minerals	284
Rarer Metals	284
Building Materials	284
Advertiser's Index	xxix

IMPORTS AND EXPORTS OF METALS AT NEW YORK SEPTEMBER 14 TO SEPTEMBER 21, 1889, AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co		179
Downing & Co., R.F		28
Hendricks Bros		28
Lamarche's Sons, H.		6
Lewisohn Bros.		84
Naylor & Co.		369
Total		685
Corres. date, 1888		1,242
Nickel.	Lbs.	Lbs.
McCoy & Sanders		11,240
Total		11,240
Corres. date, 1888		138,166
Antimony.	Casks.	Casks.
Total	1,118	2,506
Corres. date, 1888	155	2,696
Pig Lead.	Lbs.	Lbs.
Bruce & Cook		111
Caswell, E. A		10
Erie Dispatch		9
Foley, E		43
Henderson Bros		11
Hendricks Bros		78
Total		262
Corres. date, 1888		510
Tin.	Tons.	Tons.
Amer. Metal Co		969
Bidwell & French	73	983
Bruce & Cook		14
Bursley, Ira		75
Carter, Hawley & Co		41
Cohn & Co., A		12
Crooks & Co		300
Davol & Son, John	8	29
Hendricks Bros	10	174
Knauth, N. & Kuhne		10
Lehmarer, S. & Co	30	147
Mendel & Tompkins		1
Muller, Schall & Co		935
Naumann, F		2
Naylor & Co		1,520
Nissen, Geo		73
Phelps, Dodge & Co		2,845
Pope, J. E., Jr		268
Schmarer & Co		11
Schreider, J. & Co		10
Thomsen, A. A		151
Thomsen, D		176
Townsend, J. R		135
Unnamed		15
Wheeler & Co		1
Total	121	8,782
Corres. date, 1888	50	9,690
Tin Plates.	Boxes.	Boxes.
American Metal Co		477
American MetreCo		433
Brown & Co., V. H		350
Bruce & Cook	1,301	64,191
Byrne & Co., J		8,392
Central Stamp Co		69,751
Coddington & Co	3,862	117,608
Cohen, S. M		272
Cohn & Co., A	2,130	25,343
Con. Fruit Jar Co		1,334
Cort & Co., N. L	1,093	118,851
Corbier, F. & S		5,729
Crooks & Co	750	66,391
De Mill & Co		11,948
Dickerson, V. D	3,598	276,488
Downing & Co		363
Erie Dispatch		244
Fenton, D. U		2,636
Foley, E		74
G. L. N		75
Holder & Herrick		271
Iron Clad M. Co		283
Ismay, J. B		500
Lalance & G		6,857
Lazard Bros		2,356
Lombard, Ayres		3,000
Merchant & Co	1,173	19,409
Mersick & Co		8,912
Morewood & Co		7,583
Mulholland & H		767
Newell Bros		294
Payne & Son		313
Phelps, Dodge & Co	14,998	511,491
Pratt Mfg. Co		174,870
Sanders Bros		479
Shepherd & Co		23,722
Somers Bros		1,356
Taylor Co., N. & G	106	1,955
Thomsen, A. A	1,520	137,366
Warren & Co., J. M		4,134
Wheeler & Co		15,805
Whittemore & Co	852	30,789
Wolff & Reesing		7,384
Total	29,253	1,734,382
Corres. date, 1888	28,844	1,431,304
Pig Iron.	Tons.	Tons.
Baldwin, A		766
Bartlett, N. S	100	1,200
Crocker Bros	100	5,900
Crooks & Co		500
Drummond, McC. & Co	100	3,250
Henderson Bros	100	2,016
Godwin & Son, A. G		390
Irvin & Co., R		300
Martin, W. T		200
Naylor & Co		50
Page, Newall & Co		75
Perry & Ryer		125
Pierson & Co		500
Pope, Sons & Co		250
Sheldon & Co., G. W		200
Stetson & Co		4,850
Topper & Beattie		100
Walbaum & Co		275
Whittemore & Co., H		50
Williamson & Co		3,400
Total	400	25,450
Corres. date, 1888		28,651
Steel Sheets, Billets, Forging, etc.	Tons.	Tons.
Abbott & Co		2,450
Ames, W. T		253
Austin & Co		30
Baldwin Bros. & Co		15
Belcher, H. W		95
Boker, C. F		131
Carey & Moen		118
Carter, G. F		200
Coddington & Co		21
Crenshaw, Hugh		27
Crooks & Co		292
Cortis, R. J		408
Curran, J		5
Dana & Co	508	13,593
Downing & Co		171
Erie Despatch		40
Galpin, S. H		497
Hugill, Chas		95
Ismay, J. B		174
Lalance, & G		106
Lazard Bros		6
Leng's Sons, J. S		114
Lublin & Estey		7
Lundberg, G		51
Mersick & Co		5
Milne & Co		2,789
Montgomery & Co		5
Naylor & Co		2,750
Newton & S		35
Oelrich & Co		389
Pierson & Co		323
Pilditch, F. S		75
Power, C. W		36
Prosser, Thos		496
Roebling's Sons		301
Schulze & R		13
Standard Oil Co		222
Stetson & Co		11
Strouse & Co., M		25
Temple & L		15
Wagner, W. F		373
Wallace & Co		5
Wetheral Bros		30
Whitney & W		44
Wiel Elie		7
Wiell & Co		73
Williams, W		95
Williams & W		347
Wolff, R. H		4
Wright, P. & Son		
Total	508	27,382
Corres. date, 1888		17,231
Bar Iron.	Tons.	Tons.
Abbott & Co., J.	17	1,450
Bacon & Co		530
Dana & Co		25
Downing & Co		531
Froment, F		10
Fuller, Dana & Fitz		23
Haines, C. A		2
Holt & Co., H. N	10	274
Jacobus, E. G		22
Lang & Co		3
Lilienberg, N		8
Lundberg, G		1,424
Lundell, C. G		160
Merchants' Dispatch		15
Milne & Co		1,707
Muller, Schall & Co		575
Naylor & Co	63	571
Ogden & W		7
Page, N. & Co	100	1,599
Plenty, John		2
Froment, F		440
Wells, F., & Co		15
Total	190	9,095
Corres. date, 1888	306	5,623
Steel and Iron Rods.	Tons.	Tons.
Abbott & Co., J	243	4,760
American S. Co		803
Bacon & Co		350
Baker, H		3
Belcher, H. W		14
Boker, H		35
Bruce & Cook		20
Carey & Moen		851
Cooper, H. & Co		40
Crabb & Co., W		17
Dana & Co		2,203
Downing & Co		690
Durbrow, Walter		829
Eckstein, G. C		298
Fuller, D. & T		15
Galpin, S. H		1,217
Greeley & Co		8
Hazard Mfg. Co		20
Heyn, A		2,034
Hugill, Chas		27
Jansen, J. A		150
Lee & Co., James		105
Lilienberg, N		56
Lundberg, G		795
Lundell, C. G		246
Merritt, A		3
Milne & Co	221	1,525
Montgomery & Co		120
Muller, Schall & C		432
Naylor & Co	215	10,484
Nichols, B. J		10
Oelrichs & Co		103
Page, N. & Co		624
Pilditch, F. S		15
Plenty, J		1
Pratt Mfg. Co		30
Roebling's Son	34	2,006
Wagner, W. F		8
Wetherall Bros		2
Wheeler & Co., E. S		120
Whitney & Co		780
Williams & W		5
Wolf & Co	90	4,124
Wright P. & Co		3
Total	893	37,188
Corres. date, 1888	1,187	52,012
Old Rails.	Tons.	Tons.
Baldwin Bros. & Co		240
Bowring & A		57
Crossman & Bro		2,162
Frankfort, M	300	300
Henderson Bros		150
Neumark & Gross		6,115
Perkins, C. L		433
Perry & Ryer		177
Sheldon & Co		203
Ward & Co., J. E		21
Wolff, H	128	239
Total	428	9,669
Corres. date, 1888		10,097
Scrap Iron.	Tons.	Tons.
Bowring, A		25
Burgass & Co		162
Crossman, W. H. & Bro		500
Downing & Co		321
Funch, E. & Co		397
Henry, A. F		100
Neumark & Gross		500
Spaulding & Co		172
Ward & Co., J. E		559
Watjen, T. & Co		152
Total		3,388
Corres. date, 1888		2,965
Charcoal Iron.	Tons.	Tons
Bacon & Co		97
Downing & Co		671
Lilienberg N		6
Milne & Co		94
Muller, S. & Co		135
Naylor & Co		45
Page, N. & Co		754
Total		1,802
Corres. date, 1888		404
Sheet Zinc.	Lbs.	Lbs.
Crooks & Co		441,814
Lemarch's S's, H		1,554
Total		443,368
Corres. date, 1888		375
Spiegeleisen.	Tons.	Tons.
Abbott & Co		3,234
Blakely & McLellan	417	3,715
Crocker Bros	1,072	13,780
Dana & Co	1,980	11,089
Farris & Co		325
Geisenheimer & Co		160
Hernsheim, L	718	1,818
Jansen, J. A		10,463
Naylor & Co	240	12,940
Perkins, C. L		3,421
Pierson, C. L		15
Walbaum Bros		675
Total	4,427	49,910
Corres. date, 1888	1,609	36,198
Sheet Iron.	Tons.	Tons.
Coddington & Co		456
Downing & Co		16
Kelly, Hugh		5
Total		477
Corres. date, 1888	25	1,230
Iron Ore.	Tons.	Tons.
Bowring, A		1,300
DeFlores, it		200
Earnshaw, A		4,971
Lawrence, Johnson & Co		480
Total		6,951
Corres. date, 1888		26,394

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co		463,100
Amer. Metal Co	56,000	2,479,384
Am. & Patterson	22,500	1,594,224
Barber & Co		100,000
Belmont & Co		987,500
Friedenstein, Jas		2,258
Fyfe, Robert		100,000
Hurst, F. W. J		113,000
Naylor & Co		1,234,500
Orford, C. & S Co		112,013
Piper, D. & Co		3,898
Raftery, T. E		362,000
Seaman, Sam'l H		234,615
Ward & Co., J. E		11,250
Total	78,500	7,387,451
Corres. date, 1888	243,633	23,424,337
Copper Matte.		
Abbott & Co		427,613
Amer. Metal Co		3,842,705
Am. & Patterson		1,205,709
Clark, W. A		879,619
Cortis, R. J		240,000
Henriott, F		5,293,500
Nichols & Co., G. H		224,379
Oelrichs & Co		265,800
Seaman, Sam'l H		19,400
Wilms, T rhune	422,921	10,944,424
Total	422,921	24,333,309
Corres. date, 1888	603,937	37,101,505
Copper Ore.		
Burgass & Co		22,460
R. J. Cortis		34,100
Total		66,560
Corres. date, 1888		181,869

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last.		Dividends. Total paid.	Date and amount of last.	
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*	.....	.....	$555,000	Jan	1887 .15
2	Alice, s. C	Mont	10,000,000	400,000	25	*	.....	.....	775,000	Dec.	1888 .06½
3	Alma Cons., G	Idah.	300,000	30,000	10	*	.....	.....	45,000	Dec.	1888 .50
4	Alturas, G ..	Idah.	1,500,000	300,000	5	.....	.....	.....	262,500	Jan.	1889 .37½
5	Amy & Silversmith, s.	Mon.	.....	341,419	...	.....	.....	.....	247,530	Aug.	1887 .12½
6	Atlantic, C..... ..	Mich	1,000,000	40,000	25	$280,000	Apl. 1875	$1.00	520,000	Feb.	1889 3.00
7	Argenta, s.	Nev..	10,000,000	100,000	100	335,000	July 1889	.10	40,000	July	1889 .20
8	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	360,000	July	1889 .20
9	Aurora, I.. ..	Mich	2,000,000	100,000	20	*	.....	.....	155,000	Oct.	1887 1.87½
10	Bassick, G. s.	Colo.	10,000,000	100,000	100	*	.....	.....	400,000	Mar.	1884 1.00
11	Belle Isle, s.	Nev..	10,000,000	800,000	100	155,000	Apl. 1889	.10	300,00.	Dec.	.95
12	Belcher, G. s.	Nev..	10,400,000	104,000	100	2,832,000	Feb. 1889	.50	15,397,200	Apl.	1876 1.00
13	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	88,750	May 1889	.10	187,500	Jan	1887 10
14	Bodie Con., G. s.	Cal .	10,000,000	100,000	100	550,000	Mar. 1889	.50	1,295,000	Apl.	1885 .50
15	Boston & Mont., G.	Mon.	2,500,000	250,000	10	*	.....	.....	520,000	Jun.	1886 .10
16	Boston & Mont., C.s.	Mon	2,500,000	100,000	25	*	.....	.....	800,000	July	1889 1.00
17	Breece, s.	Colo	,000,000	200,000	25	*	.....	.....	2,000	Feb.	1880 .01
18	Brooklyn Lead, L. s.	Utah	500,000	50,000	10	*	.....	.....	127,000	July	1887 .05
19	Bulwer, G.	Cal.	10,000,000	100,000	100	130,000	Aug. 1889	.25	175 000	Jan.	1884 .10
20	Bunker Hill & Sull..	Idah.	3,000,000	300,000	10	*	.....	.....	150,000	Oct.	1883 .06⅔
21	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May 1885	.15	128,000	Sept	1889 .08
22	Calumet & Hecla, C..	Mich	2,500,000	100,000	25	1,200,000	.....	.....	32,350,000	July	1889 5.00
23	Carbonate Hill s. L..	Colo.	1,500,000	200,000	10	*	.....	.....	80,000	Apl.	1884 .05
24	Carlisle, G.	N. M.	1,000,000	200,000	5	.....	.....	.....	175,000	Dec.	1888 .12½
25	Castle Creek, G.	Idah.	100,000	200,000	1	.....	.....	.....	51,000	Oct.	1883 .03
26	Catalpa, s.	Colo.	3,000,000	300,000	10	*	.....	.....	272,000	May	1884 .10
27	Central, C.	Mich	500,000	20,000	25	100,000	Sept 1861	.06	1,930,000	Feb.	1889 2.00
28	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	1,650,000	Dec.	1884 .25
29	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*	.....	.....	406,000	July	1889 .05
30	Confidence, s. L.	Nev..	.....	24,980	...	287,440	Apl. 1887	.50	199,680	Apl.	1889 1.00
31	Cons. Cal. & Va., G. s.	Nev.	21,600,000	216,000	100	108,000	Jan. 1885	.20	3,196,800	Sept	1889 .50
32	Contention, s.	Ariz.	12,500,000	250,000	50	*	.....	.....	‡2,587,000	Dec.	1884 .25
33	**Cop. Queen Cons, C.	Ariz.	1,400 000	440,000	10	.....	.....	.....	140,000	Oct	1888 .50
34	Crescent, s. L. G. ...	Utah	15,000,000	600,000	25	*	.....	.....	228,000	Oct.	1888 .03
35	Crown Point, G. s..	Nev..	10,000,000	100,000	100	2,850,000	Sept 1880	.50	11,588 000	Jan.	1875 2.00
36	Daly, s. L.	Utah	3,000,000	150,000	20	*	.....	.....	1,200,000	Sept	1889 .25
37	Deer Creek, s. G.	Idah.	1 000,000	200,000	5	*	.....	.....	20,000	Jun.	1889 .05
38	Deadwood-Terra, G..	Dak..	5,000,000	200,000	25	*	.....	.....	1,000,000	Nov.	1887 .10
39	Derbec B. Grav., G. s.	Cal..	10,000,000	100,000	100	90,000	Dec. 1881	.10	180,000	May	1887 .10
40	Dunkin, s. L.	Colo.	5,000,000	200 000	25	*	.....	.....	300,000	Sept	1889 .05
41	Dunstone, G. s. L....	Mont	1,000,000	200,000	5	*	.....	.....	6,000	Nov.	1888 .03
42	Eclipse	Colo.	100,000	100,000	1	.....	.....	.....	20,000	Nov.	1887 .10
43	Elkhorn, G. s.	Mont	1,000,000	100,000	10	50,000	July 1883	.50	170,000	July	1887 .05
44	Empire L., G.	Mont	500,000	100,000	5	*	.....	.....	70,500	Oct.	1887 .37½
45	Eureka Con., G. s. L.	Nev..	5,000,000	50,000	100	550,000	Jun. 1889	.50	4,955,000	July	1888 .25
46	Evening Star, s. L....	Colo.	500,000	50,000	10	*	.....	.....	1,425,000	Apl.	1889 .25
47	Excelsior, G.	Cal..	10,000,000	100,000	100	560,000	Sept 1885	1.00	875,000	Oct.	1880 .25
48	Father de Smet, G..	Dak..	10,000,000	100 000	100	200,000	Nov 1878	1.00	1,125,000	Dec.	1885 .20
49	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun. 1871	.....	800,000	Dec.	1888 2.00
50	Freeland, G. s.	Colo.	5,000,000	200,000	25	*	.....	.....	100,000	July	1886 .10
51	Fresno Enterprise, G	Cal..	5,000,000	100,000	50	.....	Mch 1883	.10	110,000	July	1882 .10
52	Garfield Lt., G. s.	Nev.	500,000	100,000	5	.. ..	.....	.....	85,000	Apl.	1888 .12½
53	Joiconda, G. s.	Idah.	1,000,000	100,000	10	.....	.....	.....	120,000	May	1888 .60
54	Gould & Curry, G. s.	Nev..	10,300,000	108,000	100	4,402,200	May 1889	.30	‡826,800	Oct.	1870 10.00
55	Grand Central, s.	Ariz.	1,000,000	100,000	10	.....	.....	.....	625,000	Dec.	1882 .25
56	Grand Prize, s.	Nev..	10,000,000	100,000	100	655,000	July 1889	.30	495,000	Mar.	1884 .25
57	Granite, s. L.	Idah.	500,000	500,000	1	*	.....	.....	10,000	Jun.	1888 .02
58	Granite Mountain, s.	Mont	10,000,000	400,000	25	.....	.....	.....	7,200,000	Sept	1889 .50
59	Green Mountain, G....	Cal..	1,250,000	125,000	10	*	.....	.....	212,000	Nov.	1881 .07½
60	Hale & Norcross, G. s	Nev .	11,200,000	112,000	100	5,086,000	July 1887	.50	1,162,000	July	1888 .50
61	Hecla Con., s. G. L. C.	Mont	1,500,000	30,000	50	.....	.....	.....	1,332,500	May	1889 .50
62	Hel'a Mg & Red, G.S.L	Mont	3,315,000	663,000	5	.....	.....	.....	197,970	July	1889 .06
63	Holmes, s.	Nev.	10,000,000	100,000	100	300,000	Sept 1885	.10	75,000	Mar.	1886 .25
64	Holyoke, G.	Idah.	200,000	200,000	1	.....	.....	.....	27,000	Feb.	1883 .10
65	Homestake, G.	Dak..	12,500,000	125,000	100	200,000	July 1878	1.00	4,443,750	Sept	1889 .10
66	Honorine, s. L.	Utah	500,000	250,000	2	37,500	Apl. 1889	.05	125,000	Sept	1887 .05
67	Hope, s.	Mont	1,000,000	100,000	10	*	.....	.....	233,252	Apl.	1888 .25
68	Horn-Silver, G.	Utah	10,000,000	400,000	25	*	.....	.....	4,000,000	Nov.	1884 .50
69	Hubert, G.	Colo.	500,000	50,000	10	*	.....	.....	239,50.	Oct.	1888 .11
70	Idaho, G.	Cal..	310,000	3,100	100	.....	.....	.....	5,204,900	Sept	1889 5.00
71	Ideal, s. L.	Colo.	1,500,000	50,000	10	.....	.....	.....	15,000	Oct.	1886 .05
72	Illinois, s.	N. M.	100,000	100,000	1	*	.....	.....	45,000	Apl	1889 .20
73	Independence, s.	Nev.	10,000,000	100,000	100	340,000	Oct. 1886	.20	225,000	Sept	1879 .25
74	Iron Hill, s.	Dak.	2,500,000	250,000	10	134,000	July 1889	.03	156,250	Nov	1887 .07½
75	Iron-Silver, C.	Colo.	10,000,000	500,000	20	*	.....	.....	2,500,000	Apl.	1889 .20
76	Jackson, G. s.	Nev.	5,000,000	50,000	100	237,500	Nov 1880	.30	55,000	Jun	1889 .10
77	Jay Gould	Mont	2,000,000	40,000	5	*	.....	.....	365,000	Apl.	1889 .04
78	Jocuistita, G	Mex.	2,500,000	250,000	10	.....	.....	.....	1,200,000	Feb.	1885 .50
79	Jumbo, G.	Colo.	2,000,000	200,000	10	*	.....	.....	35,000	Oct.	1887 .02½
80	Kentuck.	Nev.	3,000,000	30,000	100	360,000	July 1889	.30	1,350,000	Dec.	1886 .10
81	La Plata, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	610,000	Sept	1882 .30
82	Leadville Cons., s. L.	Colo.	4,000,000	400,000	10	*	.....	.....	423,000	Apl.	1887 .05
83	Lexington, G. s.	Mont	4,000,000	40,000	100	*	.....	.....	565,000	Jan.	1885 2.00
84	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	800,000	July	1888 .10
85	Little Pittsburg, s. L	Colo.	20,000,000	200,000	100	*	.....	.....	1,050,000	Mch.	1880 .50
86	Marion Bullion, G. ..	N. C.	500,000	.....	...	.....	.....	.....	15,000	Jan.	1886 .....
87	Martin White, s.	Nev..	10,000,000	100,000	100	1,175,000	Jan. 1889	.25	140,000	Dec.	1886 .25
88	Mary Murphy, G. s.	Colo.	350,000	3,500	100	*	.....	.....	175,000	May	1888 5.00
89	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl. 1886	1 00	1,826,000	Mar.	1876 .....
90	Mono, G.	Cal.	5,000,000	50,000	100	90,350	July 1889	.25	12,500	Mar.	1886 .25
91	Montana, Lt., G. s.	Mont	3,300,000	660,000	5	*	.....	.....	2,272,785	July	1889 .06¼
92	Morning Star, s. L.	Colo.	1,000,000	100,000	10	.....	.....	.....	775,000	Mar.	1888 .25
93	Moulton, s. G.	Mont	2,000,000	400,000	5	*	.....	.....	380,000	Dec.	1887 .07½
94	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	.....	.....	150,000	Feb.	1887 .30
95	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	Jun. 1880	2.00	140,000	Jan.	1889 .40
96	Napa, Q	Cal..	700,000	100,000	7	.....	.....	.....	310,000	July	1889 .10
97	Navajo, G. s.	Nev..	10,000,000	100,000	100	485,000	Apl. 1888	.30	365,000	Apl.	1889 .10
98	New Guston, s.	Colo.	500,000	100,000	5	.....	.....	.....	150,000	July	1889 .50
99	N. Hoover Hill, G. s.	N. C	300,000	120,000	2½	.....	.....	.....	30,000	Dec.	1885 .06¼
100	Northern Belle, s.	Nev..	5,000,000	50,000	100	425,000	Jan. 1884	8.30	2,400,000	Apl.	1883 50
101	North Belle Isle, s.	Nev..	10,000,000	100,000	100	400,000	Sept 1889	.20	230,000	May	1888 .50
102	North Star, G.	Cal..	1,000,000	100,000	10	.....	.....	.....	200,000	Sept	1889 .50
103	Ontario, s. L.	Utah	15,000,000	150,000	100	.....	.....	.....	10,4 0,000	Sept	1889 .50
104	Ophir, G. s.	Nev..	10,000,000	100,000	100	4,159,440	May 1889	.50	1,995,800	July	1882 1.00
105	Original, s. G.	Mont	1,500,000	60,000	25	*	.....	.....	123,000	July	1888 .05
106	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl. 1876	1.60	1,222,500	Mar.	1859 1 00
107	Oxford, G.	N. S.	125,000	125,000	1	*	.....	.....	73,500	Sept	1888 .02
108	Paradise Valley, G. s.	Nev.	10,000,000	100,000	100	57,000	Apl. 1888	.15	150,000	Apl.	1887 .10
109	Parrot, C.	Mont	1,800,000	180,000	10	.....	.....	.....	372,000	May	1889 .10
110	Peacock, s. C.	N. M.	2,000,000	200,000	10	*	.....	.....	60,000	Nov.	1886 .....
111	Plumas Eureka, G.	Cal..	1,400,000	140,000	10	.....	.....	.....	2,495,310	Apl.	1889 .50
112	Plutus, G. s. C. L.	Colo.	2,000,000	300,000	10	*	.....	.....	40,000	Feb.	1886 .10
113	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*	.....	.....	2,280,000	Feb.	1888 .40
114	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100	.....	.....	.....	1,663,962	May	1889 1.50
115	" com., Q.	Cal..	5,700,000	57,000	100	.....	.....	.....	643,887	July	1882 .40
116	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec. 1862	.....	5,250,000	Aug.	1889 2.00
117	Richmond, s. L.	Nev.	1,350,000	54,000	25	*	.....	.....	4,312,587	Jun.	1887 1.25
118	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar 1886	.50	99,785	Feb.	1889 .50
119	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	585,000	Mar.	1886 .05
120	Robert E. Lee, s. L.	Colo	10,000,000	500,000	20	*	.....	.....	100,000	Dec.	1882 .50
121	Savage, s.	Nev..	11,200,000	112,000	100	6,542,000	July 1889	50	4,460,000	July	1889 3.00
122	Shoshone, G.	Idah.	150,000	150,000	1	.....	.....	.....	7,500	Apl.	1883 .01
123	Sierra Buttes, G.	Cal..	2,325 000	232,500	10	.....	.....	.....	1,598,145	Apl.	1888 .12½
124	Sierra Nevada, G. s.	Nev..	10,000,000	100,000	100	6,200,000	Jun. 1889	.25	102,000	Jan.	1871 1.00
125	Sierra Nevada, s. L.	Idaho	1,000,000	1	1	*	.....	.....	40,000	May	1849 .02
126	Silver Cord, G. s. L.	Colo.	4,500,000	450,000	10	.....	.....	.....	225,000	Apl.	1889 .19
127	Silver King, s.	Ariz.	10,000,000	100,000	100	50,000	Jun. 1888	.50	1,950,000	July	1887 .25
128	Silver Mg. of L.	N. M.	500,000	500,000	1	.....	.....	.....	50,000	June	1889 .05
129	Silverton, G. s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	50,000	Nov.	1886 .02
130	Small Hopes Cons., s.	Colo.	5,000,000	250,000	20	*	.....	.....	3,137,000	Jun.	1889 .10
131	Smuggler, s. L.	Colo.	600,000	60,000	10	.....	.....	.....	66,700	Aug.	1883 .25
132	Spring Valley, G.	Cal..	200,000	200,000	1	50,000	Oct. 1886	.25	50,000	Jan	1881 25
133	Standard, G. s.	Cal..	10,000,000	100,000	100	25,000	Oct. 1884	.25	8,595,000	Jun.	1888 .05
134	Stormont, s.	Utah	500,000	500,000	1	*	.....	.....	155,000	Nov.	1881 .05
135	St. Joseph, L.	Mo..	1,500,000	150,000	10	*	.....	.....	844,000	Dec.	1887 .20
136	Surinam, G.	D. G.	3,000,000	600,000	5	*	.....	.....	105,000	Nov.	1887 .05
137	Swansea, G.	Colo.	600,000	60,000	10	*	.....	.....	9,000	Apl.	1888 .02½
138	Syndicate, G.	Cal..	10,000,000	100,000	100	38,729	July 1882	.15	48,308	Sept	1885 .10
139	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl. 1885	3.00	1,080,000	Oct	1889 3.00
140	Tip Top, s	Ariz.	10,000,000	100,000	100	250,000	Sept 1883	.25	100,000	Nov.	1881 .20
141	Tombstone, G. s. L.	Ariz.	12,500,000	500,000	25	*	.....	.....	1,250,000	Apl.	1882 .10
142	United Verde, C.	Ariz.	3,000,000	300,000	10	*	.....	.....	97,500	Feb.	1884 .20
143	Valencia, M.	N. H.	150,000	1,500	100	*	.....	.....	37,500	Apl.	1886 2.50½
144	Viola Lt., s. L.	Idah.	750,000	150,000	5	*	.....	.....	272,500	Oct.	1888 .37½
145	Ward Cons., s. L.	Colo.	2,000,000	200,000	10	.....	.....	.....	10,000	Apl.	1889 .05
146	Yankee Gun	Colo.	2,500,000	250,000	10	.....	.....	.....	1,275,000	July	1887 .10
147	Yellow Jacket, G. s.	Nev.	12,000,000	120,000	100	5,508,000	Mar	1889 .50	2,184,000	Aug	1871 1.50
148	Webb City, L. Z.	Mo...	55,000	11,000	5	.....	.....	.....	3,300	Jun.	1889 .10
...	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	....

NON-DIVIDEND-PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value.	Assessments. Total levied.	Date & am't of last.
1	Agassiz Cons., s. L..	Colo.	$2,500,000	50,000	$50	*	.....
2	Alloues, C.	Mich	2,000,000	80,000	25	$697,000	Mar. 1889 .50
3	Alpha Con., G. s.	Nev..	3,000,000	30,000	100	588,750	July 1889 87½
4	Alta, s.	Nev..	10,080,000	100,800	100	2,248,800	Sept 1889 .50
5	Amador, G.	Cal..	400,000	200,000	2	*	.....
6	American Flag, s..	Colo.	1,250,000	125,000	10	300,000	Jun 1877 .5
7	Anglo-Montana, Lt.	Mon.	600,000	120,000	5	.....	.....
8	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5	.....	.....
9	Astoria, G.	Cal..	200,000	100,000	2	.....	.....
10	Barcelona, G.	Nev..	5,000,000	200,000	25	*	.....
11	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan. 1883 .10
12	Belmont, s.	Nev..	5,000,000	50,000	100	735,000	Apl. 1886 .10
13	Best & Belcher, G. s.	Nev.	10,000,000	100,800	100	2,155,390	Sept 1889 .25
14	Big Pittsburg, s. L..	Colo.	20,000,000	200,000	100	*	.....
15	Bi-Metallic, s.	Mon.	5,000,000	200,000	25	*	.....
16	Black Oak, G.	Cal..	3,000,000	300,000	10	*	.....
17	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov 1883 .2
18	Bremen, s.	N. M	5,000,000	500,000	10	*	.....
19	Brunswick, G.	Cal..	2,000 000	400,000	5	*	.....
20	Bullion, G. s.	Nev..	10,000,000	100,000	100	4,007,000	Aug. 1888 .50
21	Calaveras, G.	Cal..	500,000	500,000	1	*	.....
22	Carisa, G.	Wy	500,000	100,000	5	*	.....
23	Carupano, G. s. L. C.	Ven.	200,000	100,000	2	*	.....
24	Cashier, G. s.	Colo.	500,000	250,000	2	*	.....
25	Con. Contin'l, G. s. L.	C. & A	2,000,000	200,000	10	*	.....
26	Charles Dickens, G. s.	Idah.	1,250,000	250,000	5	*	.....
27	Cherokee, G.	Cal..	1,500,000	150,000	10	.....	.....
28	Chollar, s.	Nev..	11,200,000	112,000	100	1,484,000	July 1889 .50
29	Cleveland, T.	Dak.	1,000,000	500,000	2	*	.....
30	Coichis	N. M.	500,000	50,000	10	.....	.....
31	Commonwealth, s..	Nev.	10,000,000	100,000	100	170,000	Nov 1888 .50
32	Comstock, G. s.	Nev..	10,000,000	100,000	100	30 000	Mar. 1887 .15
33	Con. Imperial, G. s.	Nev..	5,000,000	50,000	100	1,800,000	Nov. 1888 .05
34	Con. Pacific, G. s.	Cal..	6,000 000	60,000	100	186,000	Fb . 1889 .15
35	Cons. Silver, s.	Mo...	2,500,000	250,000	10	.....	.....
36	Courtlandt	Colo.	500,000	50,000	10	.....	.....
37	Crescent, s. L.	Colo.	3,000,000	300,000	10	*	.....
38	Crocker, G.	Ariz.	10,000,000	100,000	100	125,000	Jun. 1889 .10
39	Crowell. G. s.	Nev..	500,000	500,000	1	.....	.....
40	Dahlonega, G.	Ga...	250,000	250,000	1	*	.....
41	Dandy, s.	Colo.	5,000,000	500,000	10	.. ..	.....
42	Dardanelles, G.	Cal..	1,000,000	100,000	10	.....	.....
43	Decatur, s.	Colo.	1,500,000	300,000	5	*	.....
44	Denver Con., s. L.	Colo.	5,000,000	500,000	10	*	.....
45	Denver Gold, G.	Colo.	300,000	60,000	5	*	.....
46	Durango, G.	Colo.	500,000	500,000	1	*	.....
47	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	960,000	Mar. 1886 1.00
48	El Cristo, G. s.	U.S.C	1,000,000	500,000	2	*	.....
49	El Dorado, G.	Cal..	1,000,000	250,000	4	*	.....
50	El Paso, G. s.	U.S.C	1,000,000	500,000	2	*	.....
51	Empire, s.	Utah	10,000,000	100,000	100	*	.....
52	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*	.....
53	Exchequer	Nev .	10,000,000	100,000	100	515,000	Apl. 1889 .25
54	Found Treasure, G. s.	Nev..	10,000,000	100,000	100	30,530	Apl. 1889 12½
55	Gogebic I. Syn., I.	Wis.	5,600,000	200,000	25	.....	.....
56	Golden Era, s.	Colo.	500,000	500,000	1	*	.....
57	Golden Era, s.	Mon.	2 000,000	200,000	10	*	.....
58	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec. 1885 .25
59	Gold Rock, G.	Cal.	1,000,000	500,000	2	*	.....
60	Goodshaw, G.	Cal..	10,000,000	100,000	100	*	.....
61	Grand Belt, C.	Tex.	12,000,000	120,000	100	.....	.....
62	Grand Duke	Colo.	800,000	80,000	10	.....	.....
63	Great Remance, G.	U.S.C	1,000,000	500,000	2	*	.....
64	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*	.....
65	Gregory Con., G.	Mon.	3,000,000	300,000	10	.....	.....
66	Harlem M. & M. Co, G.	Cal..	1 000,000	200,000	5	.....	.....
67	Head Cent. & Tr. s. G.	Ariz.	10,000,000	100,000	100	.....	.....
68	Highland, G.	Cal..	1,500,000	300,000	5	45,000	Jan. 1889 .15
69	Highland, G.	Mich	500,000	25,000	20	.....	.....
70	Hollywood	Cal..	200,000	100,000	2	.....	.....
71	Hortense, s.	Colo.	2,000,000	200,000	10	.....	.....
72	Huron, C.	Mich	1,000,000	40,000	25	280,000	May 1887 3.00
73	Iron Gold & Silver, s.	N. M.	2,000,000	200,000	10	*	.....
74	Ironton, I.	Wis.	1,000,000	40,000	25	.....	.....
75	Iroquois, C.	Mich	1,250,000	50,000	25	.....	.....
76	J. D. Reymert.	Ariz.	10,000,000	100,000	100	*	.....
77	Julia Cons., G. s.	Nev..	11,000,000	110,000	100	1,660,000	Jan. 1889 .10
78	Kearsarge, C.	Mich	1,250,000	50,000	25	190,000	Oct. 1887 1.00
79	Lacrosse, G.	Colo.	1,000,000	100,000	10	*	.....
80	Lee Basin, G. s.	Colo.	5,000,000	500,000	10	*	.....
81	Mammoth Bar, G.	Cal..	10,000,000	100,000	100	50,000	Dec. 1881 .....
82	May Belle, G.	Cal..	10,000,000	100,000	100	84,000	Mar. 1884 .15
83	Mayflower Gravel.	Cal..	1,000,000	100,000	10	485,000	Jan 1889 .50
84	Medora, G.	Dak.	250,000	250,000	1	*	.....
85	Mexican, s. s.	Nev.	10,000,000	100,000	100	2,775,760	July 1889 .25
86	Middle Bar, G.	Cal.	400,000	200,000	2	*	.....
87	Mike & Starr, s. L.	Colo.	1,000,000	200,000	5	*	.....
88	Monitor, G.	Colo.	100,000	100,000	1	*	.....
89	Moose Silver, s.	Colo.	3,000,000	300,000	10	*	.....
90	Mutual Mg. & Sm.	W'sh	10 0,000	100,000	1	*	.....
91	Native, C.	Mich	1,000,000	40,000	25	.....	.....
92	Nevada, G.	Colo.	1,000,000	100,000	10	.....	.....
93	Nevada Queen, s.	Nev..	10,000,000	100,000	100	230,000	Jun. 1889 .50
94	New Germany, G.	N. S.	100,000	100,000	1	*	.....
95	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*	.....
96	N. Commonw'h, s.	Nev.	10,000,000	100,000	100	60,000	Apl. 1889 .30
97	North Standard, G.	Cal..	10,000,000	100,000	100	20,000	Nov .....
98	Oneida Chief, G.	Cal..	600,000	60,000	10	408,000	Dec. 1881 .10
99	Oneida Chief, G. s.	Cal..	500,000	125,000	100	*	.....
100	Oriental & Miller, s.	Nev..	10,000,000	400,000	25	.....	.....
101	Osceola, G.	Nev..	5,000,000	50,000	100	*	.....
102	Overman, G. s.	Nev..	11,520,000	115,200	100	3,794,860	July 1889 .25
103	Park, s.	Utah	2,000,000	200,000	10	*	.....

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Sept. 21. H.	Sept. 21. L.	Sept 23. H.	Sept 23. L.	Sept. 24. H.	Sept. 24. L.	Sept. 25. H.	Sept. 25. L.	Sept. 26. H.	Sept. 26. L.	Sept. 27. H.	Sept. 27. L.	SALES.
Alice, Mon	....	....	....	....	....	....	....	....	....	....	....	....	....
Argenta, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Atlantic, Mich	....	....	....	....	....	....	....	....	....	....	....	....	....
Belcher	....	....	....	....	....	....	3 00	....	....	....	....	....	200
Belle isle, Nev	....	....	....	....	.15	....	....	....	....	....	....	....	100
Bodie Cons., Cal	....	....	.80	....	....	....	....	....	....	....	....	....	600
Boston & Mont	....	....	....	....	....	....	....	....	....	....	....	....	....
Bulwer, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....
Caledonia, Dak	....	....	....	....	....	....	3.05	....	3.05	....	....	....	1,000
Calumet & Hecla	....	....	....	....	....	....	....	....	....	....	....	....	....
Chollar, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Chrysolite	....	....	....	....	....	....	....	....	....	....	....	....	....
Colorado Cent'l, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Cons. Cal. & Va., Nev	....	....	6.84	6.75	6.88	....	6.75	6.50	6.88	....	7.25	7.13	685
Crown Point, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Deadwood, Dak	....	....	....	....	....	....	1.60	....	....	....	1.60	....	1,000
Eureka Cons	....	....	....	....	....	....	....	....	....	....	....	....	....
Father de Smet, Dak	....	....	....	....	....	....	....	....	....	....	....	....	....
Franklin, Mich	....	....	....	....	....	....	....	....	....	....	....	....	....
Gould & Curry, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Grand Prize, Nev	....	....	....	....	....	....	....	....	....	....	....	....	200
Hale & Norcross, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Holyoke, Id	....	....	....	....	....	....	....	....	....	....	....	....	200
Homestake, Dak	....	....	....	....	....	....	9.13	....	....	....	9.13	....	210
Horn-Silver, Ut	....	....	1.45	1.40	1.35	....	1.40	1.25	....	....	....	....	1,000
Iron Hill, Dak	....	....	....	....	....	....	....	....	....	....	....	....	....
Iron Silver, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Leadville C., Colo	....	....	.08	.07	....	....	....	....	.09	....	....	....	2,700
Little Chief, Colo	.35	....	.38	....	.37	....	.37	.36	....	....	....	....	2,300
Little Pittsburg, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Mono, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....
Moulton, Mont	....	....	....	....	....	....	....	....	....	....	....	....	....
Mount Diablo, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Navajo, Nev	....	....	....	....	....	....	.35	....	....	....	....	....	100
North Belle Isle, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
North Star, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....
Ontario, Ut	35.00	....	35.25	....	....	....	....	....	....	....	....	....	230
Opnir, Nev	....	....	....	....	....	....	4.60	....	....	....	....	....	100
Osceola, Mich	....	....	....	....	....	....	....	....	....	....	....	....	....
Plutus, Colo	.71	....	.74	....	....	....	.75	....	.74	....	.72	....	2,200
Plymouth, Cal	....	....	....	....	....	....	....	....	....	....	3.00	....	20
Quicksilver Pref., Cal	....	....	....	....	.35	....	....	....	....	....	....	....	150
" Com., Cal	....	....	....	....	....	....	....	....	....	....	....	....	....
Robinson Cons. Colo	....	....	....	....	....	....	....	....	.50	....	....	....	100
Savage, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Sierra Nevada, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver King, Ariz	.75	....	.80	....	....	....	.85	.65	.80	....	.85	.80	1,225
Silver Mg. of L. V	....	....	....	....	....	....	....	....	....	....	....	....	....
Small Hopes	....	....	....	....	....	....	....	....	....	....	....	....	....
Standard	....	....	....	....	....	....	....	....	1.00	....	....	....	100
Tamarack	....	....	....	....	....	....	....	....	....	....	....	....	....
Ward Con	1.65	....	1.65	1.55	1.55	1 50	1.45	1 30	1 30	1 25	1.25	1.15	6,050
Yellow Jacket	....	....	....	....	....	....	....	....	3.30	....	....	....	100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Sept. 21. H.	Sept. 21. L.	Sept. 23. H.	Sept. 23. L.	Sept 24. H.	Sept 24. L.	Scpt 25. H.	Scpt 25. L.	Sept. 26. H.	Sept. 26. L.	Sept. 27. H.	Sept. 27. L.	SALES.
Alloues, Mich	....	....	....	....	....	....	....	....	....	....	....	....	....
Alta, Nev	1.90	....	2.00	....	2.00	....	....	....	....	....	2.50	2.25	2.50	....	800
Amador, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
American Flag, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Astoria, Cal	.20	....	.20	....	.20	....	.20	....	.20	....	.20	....	.20	....	2,500
Barcelona, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Best & Belcher, Nev	....	....	....	....	....	....	3.25	....	....	....	....	....	3.40	....	350
Brunswick, Cal	.08	.07	.07	.06	.05	....	....	.04	....	.03	....	.03	....	....	20,400
Buffalo Iron Min'g	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bullion, Nev	....	....	....	....	....	....	....	....	....	....	.85	....	.75	....	300
Cashier, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Castle Creek, Id	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Colchis, N M	9.50	....	....	....	....	....	9.75	....	9.63	....	....	....	9.88	....	800
Columbia & Beaver	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Commonw'th, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Con. Imperial, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Con. Pacific, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Denver City, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Eastern Oregon	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
El Cristo, Rep of Col	....	....	....	....	....	....	1.00	....	.95	....	....	....	....	....	200
Excelsior, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Exchequer Nev	....	....	....	....	....	....	....	....	....	....	....	....	.80	....	200
Hector, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Julia, Nev	....	....	....	....	....	....	....	....	....	....	.35	....	.35	....	700
Kingst'n & Pemb'ke	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Kossuth, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lacrosse, Colo	....	....	....	....	....	....	.07	....	....	....	....	....	....	....	400
Lee Basin, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mexican, Nev	....	....	....	....	....	....	....	....	....	....	4.00	....	4.15	4.10	300
Middle Bar, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monitor, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mutual Sm. & M. Co	1.50	....	....	....	....	....	1.50	....	1.45	....	....	....	1.50	....	1,500
Nevada Queen, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
N. Com'n'w'th, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Occidental, Nev	....	....	1.50	1 45	....	....	1.50	....	....	....	....	....	....	....	800
Oriental & Mil., Nev	.05	....	....	....	....	....	06	....	.05	....	....	....	....	....	3,000
Phœnix of Ariz	.60	.57	.62	.57	.57	.52	.52	.45	.48	.38	.51	.49	9,150
Potosi, Nev	....	....	1.40	....	1 35	....	1.40	....	1 50	....	....	....	....	....	1,200
Rappahann'k, Va	.06	....	.07	.06	.07	....	07	....	.06	....	....	....	....	....	8,300
S. Sebastian, San S	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Scorpion, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Shoshone Idaho	.02	....	.02	....	.02	....	....	....	....	....	....	....	.03	.02	10,000
Silver Cord	....	....	....	....	....	....	....	....	....	....	....	....	.70	....	500
Silver Hill, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver Queen	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Stanislaus, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sutro Tunnel, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	200
" Trust Cert.	....	....	....	....	....	....	....	....	.62	....	....	....	....	....	100
Tornado, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Union Cons., Nev	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
United Copper	1.10	....	....	....	....	....	1.15	....	1.20	....	....	....	....	....	900
Utah, Nev	....	....	1.10	....	....	....	....	....	....	....	1.25	....	1.20	....	400

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities. ‡Assessment unpaid. Dividend shares sold, 20 170. Non-dividend shares sold, 53.186 Total New York, 73,356.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Sept. 20.	Sept. 21.	Sept. 23.	Sept. 24	Sept. 25.	Sept. 26.	SALES.
Atlantic, Mich	....	8.00	7.75 7.50	7 50	....	7.88	610
Bodie, Cal	....	....	....	....	....	....	....
Bonanza Developm't	.60	....	.60	.60	....	....	350
Bost. & Mont., Mont	34.50	34½	35.00	35 00	34.75	35.00	946
Breece, Colo	....	....	.15	.16	.17	....	300
Calumet & Hecla, Mich	....	214	....	214	....	215	180
Catalpa, Colo	.12	....	.13	.13	.13	....	700
Central, Mich	....	....	....	....	....	....	....
Chrysolite, Colo	.30	....	....	.30	....	....	400
Con. Cal. & Va., Nev	7.00	....	....	....	....	....	100
Dunkin, Colo	.75	.75	.75	.75	.75	....	2,100
Enterprise	....	....	....	....	....	....	....
Franklin, Mich	9.00	....	9.00	9.25	9.00	8.75	115
Hale & Norcross, Nev	....	....	....	....	....	....	....
Honorine, Utah	.30	....	.30	.30	.30	....	600
Little Chief, Colo	....	....	....	....	....	....	....
Little Pittsburg, Colo	....	....	....	....	....	....	....
Martin White, Nev	....	....	....	....	....	....	....
Mono, Cal	....	....	....	....	....	....	....
Napa, Cal	....	....	....	....	....	4.00	50
Ontario, Utah	....	....	....	....	....	....	....
Osceola, Mich	10.00	....	....	....	....	....	100
Pewabic, Mich	....	....	2.25	....	....	....	200
Quincy, Mich	....	....	50.00 49.50	50.00	....	....	10
Ridge, Mich	....	....	....	....	....	....	....
Sierra Nev., Nev	....	....	....	....	....	....	....
Silver King, Ariz	....	....	....	....	....	....	....
Standard, Cal	....	....	....	....	....	....	....
Tamarack, Mich	106½	105	106	106¼ 106	106¼	106½ 105	205

NAME OF COMPANY.	Sept. 20.	Sept. 21.	Sept. 23.	Sept. 24	Sept. 25.	Sept. 26.	SALES.
Alloues, Mich	....	....	.63	.70	70	....	300
Arnold, Mich	....	....	.06	....	.07	....	300
Aztec, Mich	.05	....	.05	....	.05	....	600
Brunswick, Cal	....	....	....	....	....	....	....
Butte & Bost., Mont	....	....	....	....	....	....	....
Canada	....	....	....	....	....	....	....
Cashier, Colo	....	....	....	....	....	....	....
Crescent, Colo	....	....	05	.05	.05	....	700
Denver City, Colo	....	....	....	....	....	....	....
Don Enrique, N M	.20	....	.20	.22	.21	....	600
Everett, Mich	....	....	....	....	....	....	....
Hanover, Mich	....	....	....	....	....	....	....
Humboldt, Mich	....	....	....	....	....	....	....
Hungarian	....	....	....	....	....	....	....
Huron, Mich	....	....	....	....	....	....	....
Kearsarge, Mich	....	....	....	5.00	....	....	100
Mesnard, Mich	....	....	....	....	....	....	....
National, Mich	.88	....	....	....	....	....	50
Native, Mich	....	....	....	....	....	....	....
Phœnix, Ariz	....	....	....	.58	....	....	500
Pontiac, Mich	....	....	....	....	....	....	....
Rappahannock, Va	....	....	....	....	....	....	....
Rockland	....	....	....	....	....	....	....
Santa Fe, N. Mex	.55	....	.55	.53	.53	.50	.50	....	3,100
Security, Colo	....	....	....	....	....	....	....
Shoshone, Idaho	....	....	....	....	....	....	....
South Side, Mich	....	....	....	....	....	....	....
St. Louis Cop., Mich	....	....	....	....	....	....	....
Sullivan, Dak	....	....	....	....	....	....	....

Boston: Dividend shares sold, 6,716. Non-dividend shares sold, 6,250. Total Boston, 12,966.

COAL STOCKS.

NAME OF COMPANY.	Par Val. of sh'rs.	Sept. 21. H.	Sept. 21. L.	Sept. 23. H.	Sept. 23. L.	Sept. 24. H.	Sept. 24. L.	Sept. 25. H.	Sept. 25. L.	Sept. 26. H.	Sept. 26. L.	Sept. 27. H.	Sept. 27. L.	Sales.
American Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cambria Iron	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cameron Coal & Iron Co	....	....	....	....	....	....	....	5	4½	6¼	5	6½	6	4.880
Ches. & O. RR	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Chic. & Ind. Coal RR	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Do. pref	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Col. & Hocking Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Col., C. & I	100	33½	33	33	....	....	....	32½	32⅜	32¾	32⅜	33½	32⅛	3,600
Consol. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Del. & H. C	100	152⅞	152¼	153⅛	152¼	152⅝	152¾	151⅞	152⅞	154	152⅞	154⅛	152¼	4.648
D., L. & W. RR	50	148⅛	147¾	148⅛	147¾	148⅛	146¾	147⅛	146⅜	147⅜	146¾	148⅛	147⅛	37,794
Hocking Valley	100	17⅛	16⅝	17⅛	17	17⅛	....	....	....	16¾	....	17½	17¼	1,160
Hunt. & Broad Top	....	....	....	20¾	....	20¾	20½	20½	....	20¼	....	....	....	635
Do. pref	....	20¾	....	....	....	46¾	....	....	....	....	....	....	....	45
Lehigh C. & N	50	....	....	54⅝	....	54¾	54⅝	54¾	....	54⅝	....	....	....	1,186
Lehigh & W. B. Coal	....	31	30	30	....	....	....	....	....	29	....	....	....	340
Lehigh Valley RR	50	54	53⅞	54	53⅞	53¾	53⅝	53⅝	....	53½	....	....	....	324
Marshall Con. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Mahoning Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Do. pref	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Maryland Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Morris & Essex	100	....	....	....	....	....	....	....	....	....	....	151	....	8
New Central Coal	50	....	....	....	....	....	....	....	....	....	....	8⅛	....	100
N. J. C. RR	100	122	120½	122¼	122	123¼	122	123⅛	121¾	125	123⅜	125½	123	14,318
N. Y. & S. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
N. Y., Susq. & Western	100	9⅛	8⅞	9⅝	9	9⅛	8¾	8½	....	8⅞	8½	8¾	....	5,154
Do. pref	100	36½	35¾	37	36½	36	35¾	36⅛	35¾	35¾	35⅝	36⅛	35⅛	6,830
N. Y. & Perry C. & I	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Norfolk & Western R.R.	50	19⅛	19¼	21	19⅛	20⅝	....	....	....	19	....	....	....	3,835
Do. pref	50	....	....	58¼	56¾	58⅛	56⅞	57¾	57⅜	57⅝	57½	57½	....	6,027
Penn. Coal	50	....	....	....	....	....	....	....	....	....	....	....	....	....
Penn. RR	50	53⅞	53⅝	53⅞	53¾	53⅞	53¼	53⅜	53⅛	53⅛	53¾	....	....	5,339
Ph. & R. RR.**	....	47¼	46¾	47⅛	46¾	46⅜	46⅛	47⅛	46¼	47¼	46⅜	47⅝	46⅞	87,453
Sunday Creek Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Do. pref	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Tennessee C. & I. Co	....	49⅝	48	50	49	53	49⅞	55¼	52¼	55	52¾	53¾	51½	34,172
Do. pref	100	101	....	....	....	100	....	102	100	101¾	101	101¾	101	1,835
Westmoreland Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	....

**Of the sales of this stock, 26,530 were in Philadelphia, and 60,923 in New York. Total sales, 219,683.

San Francisco Mining Stock Quotations.

COMPANY	CLOSING QUOTATIONS. Sept. 20.	Sept. 21.	Sept. 23.	Sept. 24.	Sept. 25.	Sept. 26.
Alpha	....	....	....	....	....	....
Alta	....	1.95	2.00	2.45	2.15	2.35
Belcher	....	....	....	....	....	....
Belle Isle	....	....	....	....	....	....
Best & Bel	....	3.35	3.20	3.40	3.35	3.50
Bodie	....	.85	.65	....	....	.75
Bulwer	....	....	....	....	....	.30
Chollar	....	2.00	1.95	1.95	....	....
C'm'weal'h	....	....	....	....	....	3.10
Con. C. & V	....	6.63	....	6.68	6.75	6.88
Con. Pac	....	....	....	....	....	....
Crown Pt	....	2.65	2.60	2.80	2 80	2.85
Eureka C	....	....	3..0	....	3.00	....
Gould & C	....	....	2.00	2.00	2.00	2.05
Grd. Prize	....	....	....	....	....	....
Hale & N	....	3.20	3.05	3.15	3.15	3.30
M. White	....	3.20	....	....	....	....
Mexican	....	3.90	3.75	3.85	3.80	4.20
Mono	....	....	.75	....	.70	....
Mt. Diablo	....	2.25	....	....	....	....
Navajo	....	....	....	.35	....	....
Nev. Queen	....	....	.65	.60	....	.60
N. Belle I	....	....	.60	....	.55	.55
Occidental	....	....	1.40	1.40	1.50	....
Ophir	....	4.70	4.65	4.75	4.80	4.90
Potosi	....	1.35	1.25	1.35	1.30	1.45
Savage	....	....	2.15	2 10	2.20	2.30
Sierra Nev	....	2.70	2.60	2.70	2.70	2.85
Union Con	....	3.15	3.05	3.15	3.20	3.35
Utah	....	1.05	.95	....	....	....
Yellow Jkt	....	3.20	....	3.20	....	3.40

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid.	Asked
Atlantic Coal		
Eat. & N. C.	.10	.25
Conrad Hill		.15
Cons. Coal	.23	.26
Diamond Tunnel	.40	.50
George's Cre. C		110
Lake Chrome		
North State (Balt.)		.25@.35
Silver Valley		

Prices bid and asked during the week ending Sept. 26th, 1889.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Con. C. & C. Co.		$28
Ala. R. Mill Co.		$60
*Alice Furnace	$102	
Anna Howe & Mg. Co	$⅜	$¾
Bess Land Co.	$22½@23	$23½@$24
Bir. Mg & M g.		$1.00
Broken Arrow		$⅜
Camule Gold Mg Co	½	⅞
De Bardeleben C. & I. Co.	$50	$55
Decat. L. Imp.		$11⅝
DecaturMin. L	$20	
Enterprise Mfg.		$38@$40
*Eureka		$105
Florence L. & Mg. Co.		$21
Hen. S. & S. Co.	$53¼@$59½	$75
Jagger Fowley C. & C		$11@$11½
Mag-Ellen	$97½	
Mary Lee C. & R. Co.		$30
Sh-ffield C & I. Co		$71
Sloss I. & S.		$44
†Sloss I. & S.	$90½	
††Sloss I & S.	$65½	
Tuscal ose C., I. & L. Co	$17	
Tenn. C. & I. Co.	$47	$48½
" Pref.	$97	$102
Woodstock I Co	$55	$58

Prices bid and asked during week ending Sept. 23d.

* Bonds. † First mortgage. †† Second mortgage.

Denver, Colo.

COMPANY.	H.	L.	Sales.
Allegheny, Colo	.50	.42½	17,900
Amity "	.24	.20	35,700
Brownlow "	.52½	.45	21,500
Calliope "	.55	.47½	15,600
Claudia, J., "	.15	.10	42,500
Clay County "	.45	.37½	29,200
Hard Money "	.25	.17	38,600
Legal Tender "	.10	.06	76,300
Matchless "	1.10	.97½	12,000
May-Mazeppa"	1.65	1.55	
Morning Glim"	.25	.20	143,200
Silver Cord "	.72½	.65	2,900
Total			436,000

Prices during the week ending Sept. 20, 1889. From the quotations published by the Denver *Mining Industry*.

Kansas City, Mo. Sept. 23.

COMPANY.	Par value.	Bid.	Asked.
Ben Harrison		$25.00	$35.00
Burch, L. & Z., Mo.	1	.20	.30
Hillsboro Gold			
Farmers' Coal Co		50.00	75.00
Ida Hill, S., N. Mex	100	90.00	100.00
K. C. Coal			1.00
Kentucky, Z., Mo.	1		.02
La Motte, Mo.	100	98.00	100.00
Maverick, S., Colo.	10	.97	1.00
Minnequa Zinc		.25	.30
Sonora, G. & S., Mex.	10	1.00	1.02
Standard, S. S., Colo.		10.00	
Silver Monument			3.00
Templar, N. Mex.	1		.20
The Sylph			2.50
Webb City, L. Z., Mo.	5	5.50	
Wichita, L. Z., Kan.	100		40.00
Granite			

Pittsburg, Pa.

COMPANY.	H.	L.	Closing
Brid. ewater Gas Co.	$42.00	$25.00	$42.00
Charlotte Mg. Co.			
Chartiers Val. Gas	50.50	49.75	49.88
Columbia Oil Co.	3.13	2.00	3.00
Forest Oil Co.	110.00	110.00	110.00
Hazlewood Oil Co.	50.75	50.00	50.75
La Noria Mining	*1.50	*1.25	*1.38
Luster Mg. Co.	10.00	10.00	10 00
Manufact. Gas Co.			
Nat. Gas Co. of W. Va	81.00	80.00	81.00
Ohio Valley Gas.	31.75	31.75	31.75
Pennsylvania Gas	16 00	15 00	16.00
People's Nat. Gas Co.	45.00	45.00	45.00
People's N. G. & P. Co.	17.38	17.38	17.38
Philadelphia Co.	36.25	35 25	36.25
Pine Run Gas Co.	91.00	90.00	90.00
Pittsburg Gas			
Silverton Mg. Co.	1.00	.75	1.00
South Side Gas.	25.00	25.00	25.00
Tuna Oil	68.00	60.00	68.00
Union Gas Co.	64.00	50.00	57.00
Washington	82.50	82 50	82.50
W'nouse A. B. Co.	*116.00	*116.00	*116 00
W'house Brake Co.	64.00	60.00	64.00
W'house E. Light	51.25	51.00	51.00
Westm'land & Cam.	28.00	25.00	28.00
Wheeling Gas.	28.13	27.00	28.00
Yankee Girl Mg.	5.75	4.00	5.00

Sales during the week ending Sept. 26:

La Noria	1,225 shs.	$1.25@$1.50
Peoples' Nat. Gas. & P. Co.	20 "	$17.38
Philadelphia Co.	791 "	$35.25@$36.25
West'house Elect.	114 "	$51.00@$51.25
Wheeling Gas Co.	145 "	$27.00@$28.25

* Actual selling price. † Ex-dividend.

St. Louis. Sept. 25.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$ .25	.27½
American & Nettie	2.05	2.25
Arizona		
Aztec, N. Mex.	.20	.21¼
Black Oak, Cal.	.17½	.20
Black Spar		
Carriboo, Idaho	.00½	.01
Central Silver	.57½	.65
Cleveland, Colo.	.05	.05½
Cleveland, Idaho	.59¼	.60
Golden Era, Mont.	.12½	.14
Golden King	.30	.35
Golden West		
Gold Run	.02	.04
Granite Mountain, Mont.		
Ingram		.75
Iron Clad	.17½	
Ivanhoe, Colo.	.30	.32½
I. X. L., Colo.	.08	.09
Keystone	.02½	.03½
La Union	.06	.08
Little Giant	.04½	.05
Major Budd, Mont.	.25	.26¼
Mexican Imp., Mex.	.28¾	.32½
Mountain Key	.88¾	.95
Mountain Lion	.30	.33¾
Neath, Colo.	.16¼	.17½
Old Colony		.16¼
Pat Murphy, Colo.	.18¾	.20
Phillips, Colo		
Pine Grove, Idaho	.07	.07½
Queen of the West, Idaho	.14½	.15
Raspberry, Mont.	.10	.30
San Francisco, Mont.	.16¼	.17½
San Pedro	.07	.08
Small Hopes, Colo.	.97½	1.05
Silver Age, Colo.	4.60	4.90
Tourtelotte, Colo.	.07½	.08½
West Granite, Mont.	1.12½	1.15
Wire Patch	.13½	.14½
Yuma, Ariz.	.30	.35

Electric Stocks. Sept. 27.

The following closing quotations are reported to-day by J. Heron Crosman, New York City:

COMPANY.	Par value.	Market price.
Brush	$ 50	$60 @ $80
" Illuminating	100	70 @ 75
Daft	100	45 @ 55
Consolidated	100	60 @ 62½
Edison	100	175 @ 190
" Illuminating	100	90 @ 95
Julien	100	20
" Traction		9 @ 10½
United States	100	50 @ 60
" " Illuminating	100	50 @ 60
Westinghouse	50	50 @ 52
Thomson-Houston		
Thomson-Hous. Welding Co		

Trust Stocks. Sept. 27.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

American Cotton Oil	$487⅛@$491⅛
Cattle Trust	16 @
Distillers' & Cattle Feeders'	40½@ 43½
Linseed Oil	@ 52½
National Lead	23⅛@ 23⅜
Natural Gas	119 @123
Standard Oil	171 @173
Sugar Refineries	89¼@ 89⅝

Sales at the New York Stock Exchange week ending Sept. 27:

	Sales.	Price H.	Price L.
American Cattle Feeders'	100	13	
American Cotton Oil	64,561	50½	48⅜
Cattle Feeders'			
National Lead	31,391	24¼	22¾
Sugar	134,097	104½	87¾

Foreign Quotations.

London. Sept. 14.

COMPANY.	Highest.	Lowest.
Alturas Gold, Idaho		
Arizona Copper, Ariz.	18s. 6d.	18s.
California Gold, Colo.		
Callao Bis, Venz.	6s. 6d.	5s. 6d.
Carlisle, N. Mex	4s 6d.	3s 6d.
Colorado United, Colo.		
Columbian, S A		
Comstock, Utah		
Cons. Esmeralda, Nev.	4s.	3s.
Denver Gold, Colo.	2s.	1s.
Dickens Custer, Idaho.	3s. 6d.	3s.
Eberhardt, Nev		
El Callao, Venezuela	£3¼	£3
Elmore, Idaho		
Empire, Mont	£1-16	£1-16
Flagstaff, Utah	2s.	1s. 9d.
Garfield, Nev.	4s.	3s.
Gold Hill, N. C.	1s. 6d.	1s.
Hambley Freehold N.C.		
Ilex, Cal	£⅜	£⅛
Jay Hawk, Mont		
Josephine, Cal	7s.	5s.
Kohinoor, Colo.	2s. 6d.	1s. 6d.
Mason & Barry, Port.	6s. 9d.	6s. 3d.
Montana Lt., Mont	£ ⅝	£1⅛
New California, Colo.		
New Consolidated		
New Eberhardt	2s.	1s. 6d.
New Emma, S., Utah	4s.	3s.
New Hoover Hill, N. C.		
New La Plata, Colo.	2s. 5d.	1s 6d.
Old Lour, Colo.		
Pittsburg Cons., Nev.	11s. 6d.	8s. 9d.
Quebrada, Venezuela		
Richmond Con., Nev.		
Ruby & Dunderberg, Nev	1s 6d.	1s.
Russell Gold, N. C.	2s 3d.	1s. 9d.
Sam Christan, N. C.	4s.	3s.
Sierra Buttes, Cal.	£⅜	£⅜
Stanly, N. C	5s.	4s.
United Mexican, Mex.	£7-16	£ 5-16
U. S. Placer, Colo.	4s.	5s.
Viola Lt., Idaho	3s. 6d.	2s. 6d.

Paris. Sept. 12.

Belmez, Spain	550.00	550.00
Bolco, Mex		
Callao Bis, Venez	7.50	7.50
East Oregon, Ore	19.00	19.00
Forest Hill Divide, Cal	360.00	360.00
Golden River, Cal	390.00	390.00
" " parts	35.00	35.00
Lexington, Mont	110.00	110.00
" parts	5.00	5.00
Ouray, Colo		
Rio Tinto, Spain	295.00	295.00
Tharsis, Spain	95.65	95.65

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ₱ 100 lbs. $2.00
Muriatic, 18°, ₱ 100 lbs. 1.25@1.50
Muriatic, 20°, ₱ 100 lbs. 1.50@1.75
Muriatic, 22° ₱ 100 lbs. 1.75@2.00
Nitric, 36°, ₱ 100 lbs. 4.00@4.25
Nitric, 42°, ₱ 100 lbs. 6.00@6.25
Oxalic, ₱ 100 lbs. 9.50@10.50
Sulphuric, 60°, ₱ 100 lbs. 80@1.25
Sulphuric, 66°, ₱ 100 lbs. 1.12½@1.75
Alkali—36 p. c. 1.15@1.17½
Refined, 48 p. c. 1.20@1.22½
Refined, 58°. 1.13½@1.15
Alum—Lump, ₱ lb. 1¾
Ground, ₱ lb. 1¾@2
Lump ₱ ton, Liverpool £4 17 6
Sulphate of Alumina, ₱ ton £4 10
Aqua Ammonia—18°, ₱ lb. 4¾
20°, ₱ lb. 6
22°, ₱ lb. 6@7
26°, ₱ lb. 10@11
Ammonia—Sul., ₱ 100 lbs. 3.05@3.10
Carb., per lb. 7½@8½
Arsenic—White, powdered, ₱ lb. 3¾@3¾
Red, ₱ lb. 7¾@8¾
White, at Plymouth, ₱ ton £12 6s
Asbestos—Am., p. ton $50@$300
Italian, p. ton, c. i. f. L'pool £18@£25
Asphaltum—P. ton 13.00
Prime Cuban, ₱ lb. 4½@5½c.
Hard Cuban, ₱ ton $28.00
Trinidad, refined, ₱ ton $30.00
Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19@21
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f.o.b. L'pool, ton £3
No. 1, casks, Runcorn " £4 10 0
No 2, bags Runcorn " " 3 15 0
Bleach—Over 35 p.c., ₱ lb. 1.75@1.85
Borax—R-fined, ₱ lb. 9¼
Concentrated 7¾@8¾
Refined at Liverpool, ₱ ton £9
Brimstone—*See Sulphur.*
Bromine—₱ lb. 37@38
Chalk—₱ ton 2.00
Precipitated, ₱ lb. 4¾@5
China Clay—English, ₱ ton 13.50@18.00
Southern, ₱ ton 13.50
Chrome Yellow—₱ lb. 1 @25
Cobalt—Oxide, ₱ lb. 2.60@2.90
Copper—Sulph. English Wks., ton £30
Precip., Eng. Wks, unit fluctuating
Copperas—Common, ₱ 100 lbs. 60@70
Best, ₱ 100 lbs. 75@1.00
Liverpool, ₱ ton, in casks £1 15s.
Cream of Tartar—Am. 99% 22½
Powdered, 99 p. c. 23
Emery—Grain, ₱ lb. 4½@5
Flour, ₱ lb. 3¾@4½
Feldspar—Ground, ₱ ton 10.00
Fuller's Earth—Lump, ₱ bbl. .90@.95
Powdered, ₱ lb. 1⅝@2
Gypsum—Calcined, ₱ bbl. 1.25
Iodine—Resublimed 2.75
Kainit—₱ ton 9.75@11.00
Kaolin—*See China Clay.*
Lead—Red, ₱ lb. 6¾@7
White, American, in oil, ₱ lb. 6¾@7¼
White, English, ₱ lb 8½@8¾
Acetate, or sugar of 12@13
Lime Acetate—Amer. Brown .95@1.00
" Gray 1.75@1.87½
Litharge—Powdered, ₱ lb. 6½@6¾
English flake, ₱ lb. 9@9½
Magnesite—Greek, ₱ ton 20.00
Manganese—Crude, per unit .23@.28
Oxide, ground, per lb 2½@6½
Mercuric Chloride—(*Corrosive Sublimate*), ₱ lb. 70@72
Mineral Wool—₱ lb. 2
Mica—In sheets according to size, 1st quality, ₱ lb. .25@$6.00
Ochre—Yellow, "B. F.," ₱ ton, f.o.b. mill 30.00
"J. F. L. S.," ₱ lb. ex dock 2½
Phosphate Rock—S. Carolina, per ton, o. b. Charleston 5.50@6.75
Ground, ex vessel New York 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ₱ ton 16.00
Phosphorus—₱ lb. 70@75
Plumbago—Ceylon, ₱ lb. 4@5
American, ₱ lb. 5@7
Potassium—Cyanide, ₱ lb. 39@40
Bromide, ₱ lb. 33
Chlorate, ₱ lb. 13@14
Carb. ₱ lb 4.70@5.50
Caustic, ₱ lb 7½@8
Iodide .2.45@2.50
Muriate, ₱ 100 lbs. 1.80
Nitrate, refined, ₱ lb. 6@8
Bichromate, ₱ lb 10½@11
Sulphate, ₱ 100 lbs. 2.30@2.35
Yellow Prussiate, ₱ lb. 17½@18
Red Prussiate, ₱ lb. 42@45
Pumice Stone—Select lumps, lb. 0¼
Original cks., ₱ lb. 1¾@2
Powdered, pure, ₱ lb. 2¼@2½
Pyrites—Non-cupreous, p. units 10d
Quartz—Ground, ₱ ton. 14.00@16.00
Rotten Stone—Powdered, ₱ lb. 3¼@3¾
Lump, ₱ lb. 6@10
Salt—Liverpool, ground ₱ sack .75@80
Turk's Island, ₱ bush 27@27
Salt Cake—₱ lb. 62½@65
Saltpeter—Crude, ₱ lb. 5½@5¾
Refined, ₱ lb. @6
Soda Ash—Carb., 48 % 100 ₱ 1.25@1.30
Caustic, 48 % 1.20@1.25
Soda Caustic, 60% 2.45@2.50
" " 70% 2.30
" " 74-6% 2.30
Sal, English, ₱ 100 lbs. .95@1.00
Sal, American, ₱ 100 lbs .90
Nitrate 100 lbs. 1.90
Strontium—Nitrate ₱ lb. 9@9¼
Sulphur—Roll, ₱ lb. 1¾
Flour, ₱ lb 2
Crude Brimstone, 2s, ₱ ton. 19.50
Crude Brimstone, 3ds, ₱ ton. 19 00
Talc—Ground French, ₱ lb. 1¼@1½
Domestic, ₱ ton $18@$20
c. i. f. Liverpool, ₱ ton £4 5
Vermillion—American, ₱ lb. 61
English, ₱ lb. 82@85
Vitriol—(Blue), Ordinary, ₱ lb. 5½@5¾
Extra, ₱ lb 7
Zinc Oxide—Am., Dry, ₱ lb. 4½
Antwerp, Red Seal, ₱ lb. 6@6½
Paris, Red Seal, ₱ lb. 6½@7
* Spot

THE RARER METALS.

Aluminum—(Metallic), ₱ lb. $4.00
Sheet, per lb. 6.00@8.00
Arsenic—Metallic, per lb. .40
Barium—(Metallic), per gram $4.00
Bismuth—(Metallic), per lb. 2.75
Cadmium—(Metallic), per lb. 1 00
Calcium—(Metallic), per gram 10.00
Cerium—(Metallic) per gram 7.50
Chromium—(Metallic), per gram 1.00
Cobalt—(Metallic), per lb. 6.00
Didymium—(Metallic), per gram 9 00
Erbium—(Metallic), per gram 7.50
Gallium—(Metallic), per gram 140 00
Glucinum—(Metallic) per gram 12.00
Indium—(Metallic), per gram 9.00
Iridium—(Metallic), per oz. 7.00
Lanthanum—(Metallic), per gr. 10.00
Lithium—(Metallic), per gram 10.00
Magnesium—Per lb. 4.50
Manganese—Metallic, per lb. 1.10
Chem. pure, per oz. 10.00
Molybdenum—(Metallic), per gm. 50
Niobium—(Metallic), per gram 5.00
Osmium—(Metallic), per oz. 65.00
Palladium—(Metallic), per oz. 35.00
Platinum—(Metallic), per oz. 9.00
Potassium—Metallic, per lb. 28.00
Rhodium—(Metallic), per gram. 5.00
Ruthenium—(Metallic), per gm. 5.50
Rubidium—(Metallic), per gram 2.00
Selenium—(Metallic), per oz. 1.80
Sodium—(Metallic) per lb. 2.50
Strontium—(Metallic), per gm. 60
Tantalum—(Metallic) per gram 9.00
Telurium—(Metallic) per oz. 15 00
Thallium—(Metallic) per gram .25
Titanium—(Metallic) per gram 2.25
Thorium—(Metallic) per gram 17.00
Tungsten—(Metallic) per oz. 2.25
Vanadium—(Metallic), per gm. 22.00
Yttrium—(Metallic), per gram. 9 00
Zirconium—(Metallic), per oz. 65.00

RARE MINERALS.

	Per lb. Cents.
Molybdenite	.32
Gadolinite	2.54
Zyrcon	1.27
Cerite	.32
Orthite	.13
Rutile	.20
Thorite	10.54
Yttrotitanite	.20
Columbite	.94

BUILDING MATERIAL.

Bricks—Pale, ₱ 1,000 3 25@3.75
Jerseys, ₱ 1,000 4 75@5.25
Up Rivers, ₱ 1000 5 00@5.50
Haverstraw seconds, ₱ 1000 5.50@5.75
Haverstraw firsts ₱ 1,000 5.75@6.00
Fronts, nominal, ₱ 1000.
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.50
Trenton @22.00
Baltimore
Building Stone—Amherst freestone, ₱ cu. ft. 95@1.00
Brownstone, ₱ cu. ft. 1.00@1.35
Granite, rough, ₱ cu. ft. 45@1.25
Granite, Scotch ₱ cu. ft. 1.00@1.15
Cement—Rosendale, ₱ bbl. .93@1.10
Portland, American, ₱ bbl. 2 15@2 45
Portland, foreign, ₱ bbl. 2 30@2.40
Portland, " special brands. 2.45@2.75
Roman, ₱ bbl. 2.60@2 85
Keene's coarse, ₱ bbl. 4 50@5.50
Keene's fine, ₱ bbl. 7.00@8.25
Slate—Purple and green roofing, ₱ 100 ft. 7.00@7.50
Red roofing, ₱ 100 sq. ft. 12.00
Black, roofing, ₱ 100 sq. ft. 4.25@5..0
Lime—Rockland, common ₱ bbl. 1 00
Rockland, finishing, ₱ bbl. 1.20
St. John, com. and finish, ₱ bb'. .90@.95
Glens Falls, com. and fin., ₱ bbl. .85@1.10
Labor—Ordinary, ₱ day 1.50@2.00
Masons, ₱ day 4.00
Plasterers, ₱ day 4.00
Carpenters, ₱ day 3.50
Plumbers, ₱ day 3.50
Painters, ₱ day 2.50@3.50
Stonecutters, ₱ day 3.50@4 00
Tilelayers, ₱ day 3.50@4.50
Bricklayers, ₱ day 4.00

THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.